

The Iron Age

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Bacon's Double-Cylinder Winding Engine.

Winding engines for mines and for hoisting purposes generally have within the past few years attained a degree of considerable prominence. The engraving which we give on this page of a new double-cylinder engine of this type, built by Messrs. Copeland & Bacon, 85 Liberty street, New York, will therefore prove of some interest.

The engine was designed specially for heavy lifts over long distances, where a high rate of speed and great power are absolutely necessary for profitable working. For this purpose it has already proved itself well adapted, and also for the working of inclines, the construction of which is one of Messrs. Copeland & Bacon's specialties. The engines have given great satisfaction, and in many places they are now hauling out from 600 to 1000 tons of ore day after day. The item of repairs, we are told, is, moreover, very small. The simplicity of the engine is a very striking feature and scarcely requires pointing out. Two designs are being put on the market, one of them embracing the use of a friction drum, as shown in Fig. 1, while the other is of the reversing type, being furnished with a link. This is illustrated in Fig. 2. The main features of both types, however, are alike. In the former an easy movement of the friction lever, arranged at one side, through the action of a screw of large pitch, throws the drum in gear and retains it in its place by a very slight pressure. In lowering, the drum is thrown out of gear and overhauled rapidly by the weight of the skip or car, being at all times perfectly controlled by a powerful foot brake. This does away entirely with the use of steam for the purpose of lowering.

The engines are also made with either single or double drums, and of sizes to suit every possible requirement of practice. The smallest size has 8 x 12 in. cylinders, while those of the largest thus far turned out measure 20 x 24 in.

The Possibilities of a Coking Coal in the Coosa Coalfield.

The Coosa Coalfield consists of two bifurcated troughs or basins uniting at the north-east end, and after separating extend south-westward about 30 miles. Between these two divisions is an uplift of lower Silurian limestones, which cause the strata of the coalfields contiguous to them to be pitched at a very considerable angle; that of the western division dipping rapidly to the northwest, that of the eastern division to the southeast from the central line. Up to the present time no coal of any value has been found in the eastern division, and there is every probability that it does not exist there. Hence it is to the western division that the miner or investor must look for any workable coal. So far there are known to be two, and in all probability three workable seams in this field. The seam called Ragland is found at the head of both fields in the broad area where the two divisions come together, and somewhat more at the head of the eastern division. It has been for some reason more extensively worked than any other seam, though not averaging over 30 inches in thickness.

Every effort has been made to produce from this coal a coke that would make good iron, with the most decided failures. The Thomas ovens were erected with the hope that they would improve its quality, but the result was no better than by the common bessemer. The coke from the coal as analyzed by John Fulton, of the Cambria Works, Johnstown, contains:

Moisture.....	0.09
Carbon.....	85.76
Ash.....	11.54
Sulphur.....	2.43

It is true that the sulphur is high, but not sufficiently so but that some of it should not be washed out, and then, too, the singular effects on the iron produced with it are not to be accounted for by its presence alone. This coke has been almost entirely used at the Cherokee Iron Company's furnace at Cedartown, and it has never been possible to make any but the hardest of iron with it alone. It is stated that every care has been taken in washing it, but the apparatus of the Coosa Coal Company is poorly arranged, and might be said to be of very indifferent quality. That of the St. Clair Company is better, but even their coke made in the Thomas ovens has not given any better results in the furnace. That the cause of this trouble is not the sulphur is practically evidenced by the fact that Etna coke with near or quite as much sulphur is an excellent furnace fuel and makes a good iron. It is my opinion that the coal has arsenic in the sulphur contained in it. The sulphur does not seem to be present as pyrites but to be finely intermingled in the aluminous slate, which is the impurity of the coal. The results with this coke had been so bad at Cherokee Furnace that it was determined to send a lot of it to Citico for test. A number of carloads were sent there and charged to the furnace as follows:

1-5 Ragland coke, the balance Soddy for 30 hours.	
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This exhausts the amount sent, which was 276½ tons. The furnace was worked at

1350° of heat of blast, and was in good condition, and the run was made on rich red fossil ores. The result of the first two mixtures was a tolerably good iron, but the quality fell rapidly in the last two portions to white iron. A carload of this iron was sent to Cleveland, Ohio, and thrown back on the hands of the Citico Company, being returned with the statement that it could not

men say they had never before seen anything resembling it. I had before this intended to send a specimen of this slag with the yellow incrustation to Prof. A. S. McCreath, but pressure of other business has caused me to neglect it. The area underlaid with this seam of coal is small, and no business man can visit the mines and the expensive plants and not wonder why

Ash..... 9.95
Sulphur..... 1.30
An analysis by Britton of the coke made from this coal is:
Sulphur..... 1.23
Carbon and volatile matter..... 86.76
Ash..... 12.01
This seam of coal is about 4½ feet thick, very friable, breaking into small cubes and

Coal Company and leased to the Coosa Coal Company, which latter is the same as the Cherokee Iron Company. As above stated, the seam is about 4½ feet thick, and dips to the northwest. It is here worked by a slope, and the coal is drawn up to an elevated plane, then dumped to the crushers, thence brought up by buckets to the washers, which consist of troughs and a very imperfect jig washer. The washing is very imperfect if not carelessly done, and, if it were better, almost the entire amount of sulphur might be extracted from the coal. For some reason the management at the mine has endeavored rather to depreciate this coal and strained every point to make a decent coke out of the coal from the Ragland seam. I have shown that this effort has proven a failure.

The coal from the Broken Arrow seam makes a good coke. It is, so far as now known, the seam in which may be realized the hope of a coking coal in the Coosa coalfield. At Broken Arrow town, its dip at outcrop is near 45°, but it undoubtedly becomes horizontal at no great distance down, and to the northwest will be found a large area of country underlaid by it, where the rocks are regular and undisturbed. The slope at Broken Arrow is not over half a mile from the line of the great fault which bounds the western division on the eastern side, and I am inclined to think there is another and lesser fault between. The Coosa coalfield offers an unknown and interesting field to the student and prospector. Captain West at one time proposed to put a diamond drill into the field, and there was a hope that he would do so, and the true value and number of the coal seams would be known. The amount of information thus derived would have been very great, but for some reason he faltered and then entirely abandoned the enterprise. Professor Tuomey thought more highly of the Coosa coalfield than of any in Alabama, but operations there have not so far confirmed his opinions. At the same time I am satisfied that a good coke—as good as any in the South—can be made from the Broken Arrow seam, and I am equally satisfied that that seam underlies a very considerable area of surface, and that there are points west and northwest of Broken Arrow where the seam can be worked by shaft with economy and a large output secured.

The transportation facilities of this field are excellent. The Georgia Pacific Railroad, a first-class wide-gauge road, reaching to Atlanta on the East and to Birmingham on the West, cuts across it near the middle, probably where there is the best coal, there being several good outcrops in the neighborhood, which, very singularly, have not been opened at all. A few miles off is a good seam which was worked during the war and much coke made therefrom. The E. and W. Railroad, from Cedartown and Cedartown, crosses the upper end of the field and runs down along the eastern border of the western division. It affords many localities where coal could be opened and operations carried on, and, should it be extended to Birmingham, will still further traverse the valuable part of the field, and thus afford the best of opportunities for mining and car transportation.

H. E. C.

The Status of Steel in Great Britain

In an exhaustive record of progress during 1886, the *Engineer* makes the following references to steel:

Scant progress has been made during the past year in improving the quality of steel, but facts are surely if slowly accumulating, which are tending to make the use of steel freer in every way from trouble and disappointment. It is more than ever certain that there is steel and steel. Provided the right sort of steel is used in the right way all will be well. If not, then loss and disappointment must ensue. A keen discussion has gone on between Lloyd's and the Board of Trade. As a result of prolonged experience derived from an intimate acquaintance with the behavior of steel, Lloyd's lowered their standards. These were for a long time 25 tons as a minimum and 30 tons as a maximum in all plates up to 1 inch thick. In order to discourage the manufacture of steels with a large percentage of carbon, Lloyd's during the past year altered their standard. Retaining 26 tons as the lower limit, they fixed 29 tons as the major limit for plates up to 1¼ inch thick; above 1¼ inch the major limit was reduced to 28 tons. But for similar plates the Board of Trade insisted on 27 tons and 32 tons. No one at the Board of Trade possesses the knowledge acquired, as we have said, by daily experience by Lloyd's engineers and surveyors; and there can be no question that the Board of Trade, by steadfastly ignoring the caprices of steel, and assuming that that which is nominally strongest must really be best, pursued an erroneous policy. The result was that steel makers were practically unable to comply with the conditions laid down by the Board of Trade and Lloyd's, because the lowest limit of the former was only one ton less than the highest limit of the latter; consequently no one would roll plates 1¼ inch thick.

This was a serious obstacle in the way of carrying high pressures at sea, and in the end Lloyd's had to give way. The results

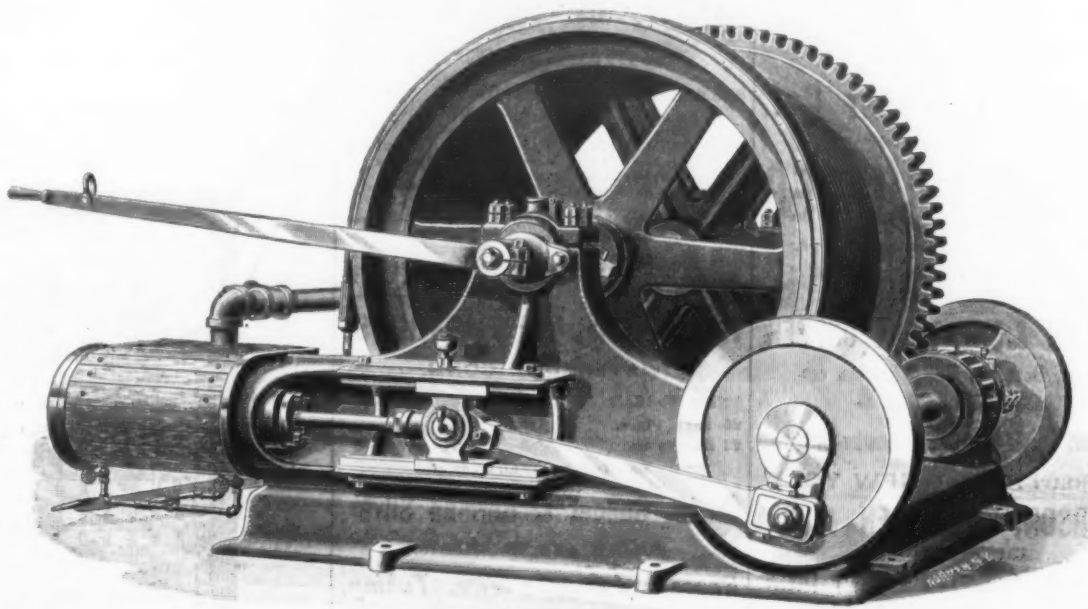


Fig. 1.—General View of Engine with Friction Drum.

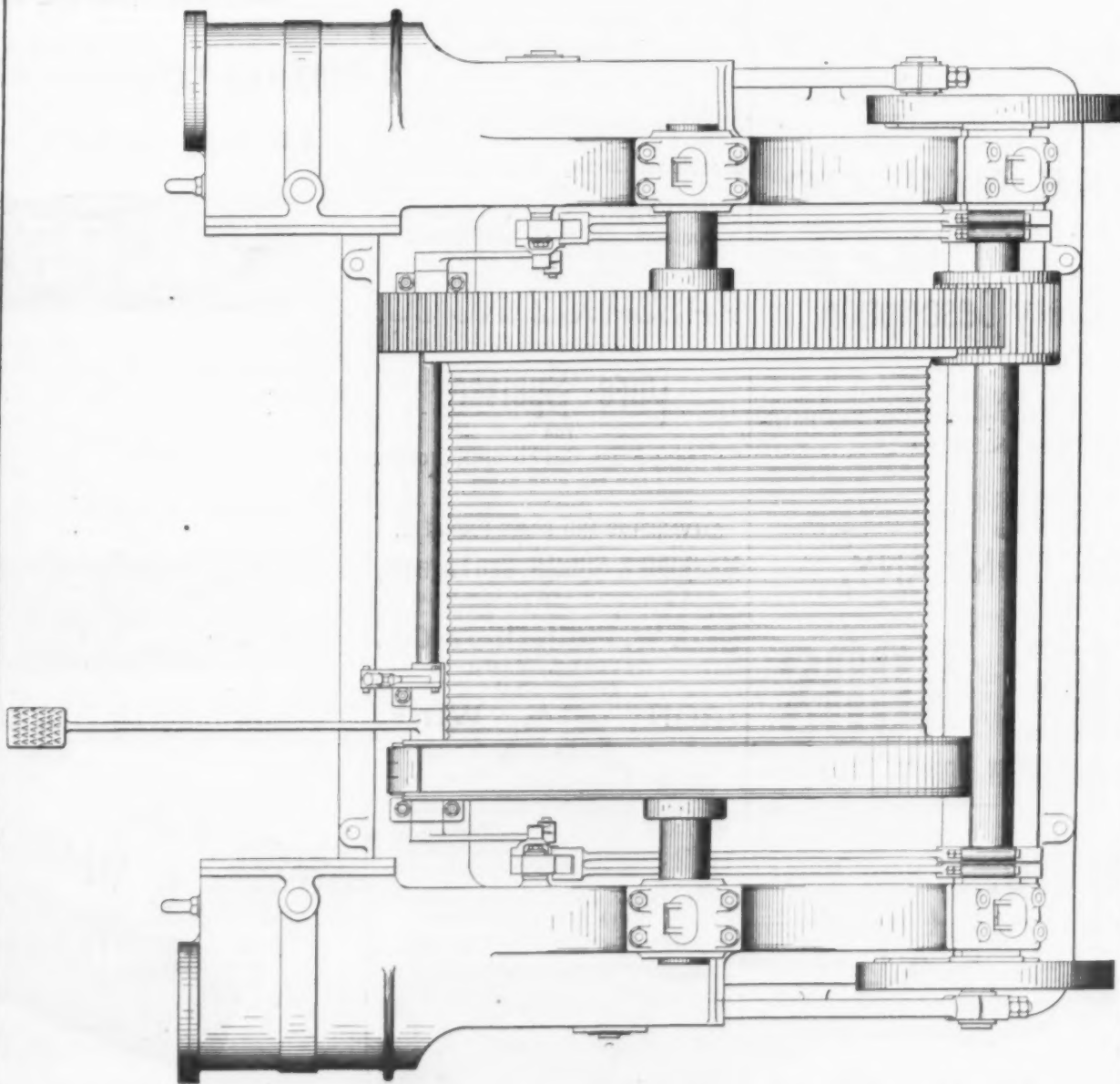


Fig. 2.—Plan of Engine with Link Motion.

DOUBLE-CYLINDER WINDING ENGINE, BUILT BY COPELAND & BACON, NEW YORK.

be drilled with any ordinary tools, thus showing that it had a hardness beyond that of common white iron, and contains some substance which gave it that hardness. In the experiments at Citico the Etna coke usually used was taken off, and the Ragland put on in its place. The same proportions of Etna make a good foundry iron, though it is very sulphurous. The slag made at Cherokee Furnace, when the run is on this Ragland coke alone, on exposure gives off a singular looking yellow efflorescence. I have heard a number of experienced iron

there should have been so much outlay upon a coal occupying such a limited area. The other known seam of the Coosa Coalfield is usually called the "Broken Arrow" seam, from its having been first found on a creek of that name. The average of three analyses of this coal made by Mr. Geo. H. Rowan at the University of Virginia, under the supervision of the professor of chemistry, is as follows:

Moisture.....	1.10
Volatile matter.....	27.08
Fixed carbon.....	69.80

has its sulphur in the form of balls as pure iron pyrites. Worked alone in the Cherokee Furnace it made a good No. 2 foundry pig. The consumption was about 1.7 tons to the ton of pig made. The coke costs at the furnace \$3 15 per ton, of which 65 cents is railroad freights, but this is no guide for any one else, as by the system of book-keeping at the coal mine, the mine is made to appear to pay by charging the furnace a high price for the coke. The mine now worked in this seam is near the village of Broken Arrow; it is owned by the Broken Arrow

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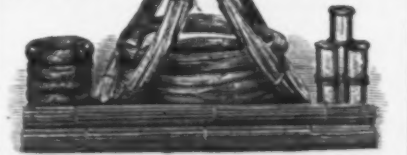
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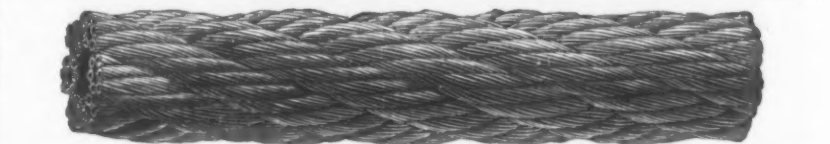
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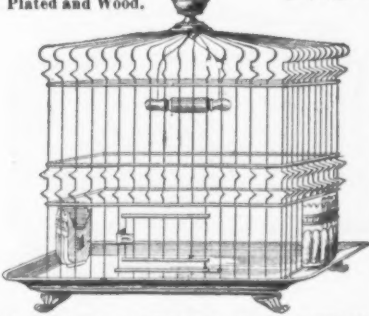
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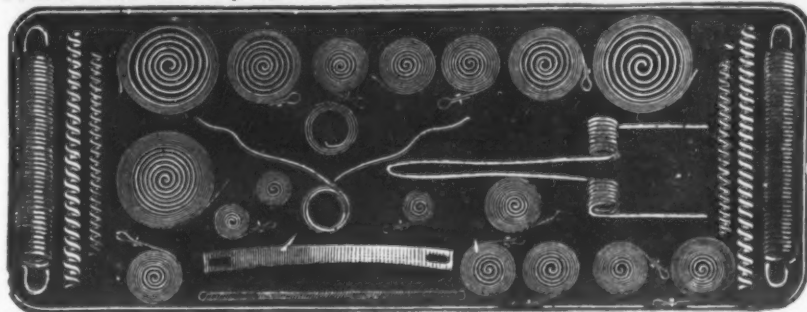
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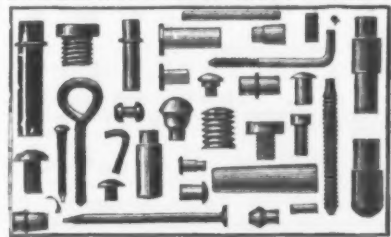
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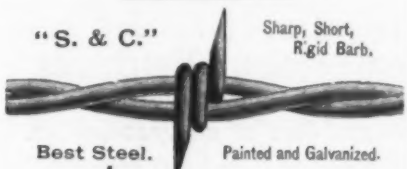
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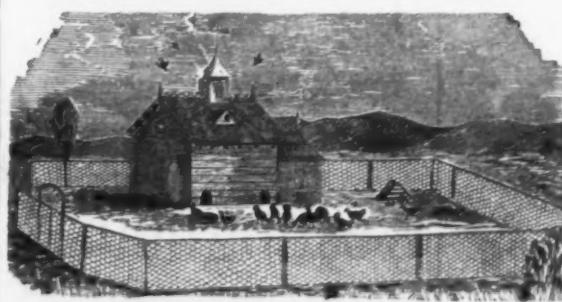
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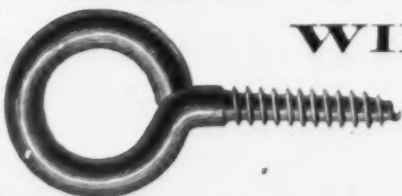
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Selling Agents PINE IRON WORKS, Pine Brand Plates; GLASGOW IRON CO., Plates and Muck Bars; SPANG STEEL & IRON CO., Limited, Siemens-Martin (Open-Hearth) Steel, Universal and Sheared Plates, Angles and Shapes.

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Pig Iron & Ores, Steel & Iron Blooms.
Agent for Briar Hill Iron and Coal Co., Youngstown Steel Co. Open Hearth Metal, Charcoal Iron, Connelville Coke, Old Rails, Scrap, &c.

Andover Pig Iron
FOR BEST MILL PRODUCTS.
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Iron Founders,
Light Castings a Specialty.
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Correspondence solicited.
Established 1847.

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Special Wheels for Furnace and Mine Cars.

are not satisfactory. In a great many cases where hard steels have been used, cracked plates have followed. This cracking is partly due, perhaps, to the enormous size of the plates now made, running, as they do, to 25 feet long by 4 feet 6 inches wide, and 1 1/2 inches thick, weighing something like three tons. These plates, as they come from the works, are seldom flat. They are passed through vertical rolls to be bent to shape for boiler shells, and they are thus supposed to be fairly; but the strains set up by taking the buckles out of hard plates, which buckles are really the result of a contest of forces in the substance of the plate, pulling this way and that—are such that the plates crack either in the rolls or very soon after they are worked into the boilers. Nothing is heard about these failures, but they take place nevertheless. As an example of the stresses existing in steel, we may mention that Mr. Stroudley, using steel frame plates for locomotives about 14 inches thick, in slotting out the horn plate spaces, &c., bolts six plates together on the neck of the machine. These plates are at the time dead flat. After the slotting operation is over they are found, when taken off the machine, in nine cases out of 10 to have cast in various directions, simply because certain stresses have been cut out of them. They are then sent back to the forge to be straightened, and the work of slotting them is then finished. While on the subject of locomotive frames, we may mention that Mr. Fox has put down a splendid plant, and is now stamping outside frames in one piece, flanged all round the axle guards and the edges. It is, of course, impossible to say as yet how these will answer in practice.

Returning to the question of steel for boilers and ships, we find that Lloyd's have provisionally rejected basic steel for all purposes, whether made by the Bessemer or the Siemens process. This policy is due to the unfortunate circumstance that a considerable quantity of very indifferent basic steel was put on the market at first. This was basic Bessemer, and it is now clear that basic steel plates cannot be made by the Bessemer process, although it is quite possible that with care they may be made by the Siemens process. There is no indication that any change in this respect will take place during the present year. Before taking leave of steel we would call attention to a remarkable letter which appeared in our last impression going to show that in the United States the most satisfactory results have been got as to steel fire-boxes, the metal being almost entirely free from phosphorus. It is well known that phosphorus makes steel cold-short, but it was not supposed to do much harm to plates subjected to heat. However, as fire-box plates always crack when the fires are out, it seems clear that it is cold-shortness that ought to be provided against.

Manufacturing Grindstones.

A correspondent of the Portland Transcript gives a description of a visit to the Bay of Fundy and along the shores, where the grindstone quarries are located. The superintendent of the quarry says when the tide is out his men go down on the rocky shore and work out near the water. At low tide the men on the shore drill some holes in the ledge, put in powder and blast out great pieces of rock. When the tide rises again they float out some big logs and empty barrels over where the loosened rocks are. When the water goes down again they fasten a big rock to the raft with heavy chains, so when the tide again rises it lifts up the raft and the rock with it. Then they tow it as near the shore as they can. If it is the right kind and size for a millstone sometimes it is allowed to lie there until the workmen, with stone chisel and hammer work it into the proper shape. At other times, by means of a derrick, it is drawn out on the wharf. Then it is rolled on a track and hauled to the factory.

At the great stone factory the large piece of rock is placed on a carriage, and, with a saw similar to the up-and-down saw in a mill, the rock is sawed into great slabs of the right thickness for the grindstone. The saw does not have teeth, but wears its way through the rock with the aid of sand and water, which are continually poured on. Then the slabs are taken, a hole made in the center, the edges trimmed off with a chisel, and the whole placed on a kind of lathe, turning it until it is true and the edge smooth. The rock from which the grindstones are made is a kind of sandstone, and there is a great difference in the "grit," some being coarse and some fine. Often several different degrees of "grit" are found in the same quarry. There are many quarries along the shores of the Bay of Fundy. The reason stone is taken from under the water, when there are many quarries a little distance from the shore, is because the best stone comes from the bottom of the bay, where it is covered at high tide.

The London Iron Trade Review prints the following returns for the furnaces in and out of blast in Great Britain:

Summary.			
	In.	Out.	Total.
South Staffordshire	30	80	110
North Staffordshire	18	22	40
Shropshire	6	17	23
Cleveland	45	70	115
Yorkshire, West Riding	14	30	44
Derby, Nottingham and Leicester	22	35	57
Northamptonshire	14	14	28
Lincolnshire	13	8	21
Lancashire and Cumberland	56	47	103
Gloucestershire	1	7	8
Hants, Wilts and Somerset	2	6	8
North Wales	5	5	10
South Wales	32	108	140
Scotland	75	66	141
	273	509	882

Summary of Returns for 12 Months.			
	In.	Out.	Total.
January 1, 1886	421	469	890
February 1, 1886	432	466	898
March 1, 1886	463	465	928
April 1, 1886	416	472	888
May 1, 1886	407	479	886
June 1, 1886	461	466	927
July 1, 1886	292	494	786
August 1, 1886	297	496	793
September 1, 1886	377	509	886
October 1, 1886	390	523	913
November 1, 1886	364	520	884
December 1, 1886	365	517	882
January 1, 1887	373	546	919

ESTABLISHED IN 1848.
SINGER, NIMICK & CO., Ltd.,
 PITTSBURGH, PA.,

MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

STEEL,

WARRANTED EQUAL TO ANY PRODUCED.

BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives, Cold-Chisels and Machinists' Tools generally.

SAW PLATES

For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

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SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire Boxes, Smoke-Stacks, Tanks, &c.

All our Plate and Sheet Steel being rolled by a Patented Improvement, is unequalled for surface finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.; Cast and German Spring and Plow Steel.

For Center "Cast Plow Steel. | Finished Rolling Plow Coulters, with Patent Screw Hubs
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Represented a 243 Pearl and 18 Cliff Sts., New York, by

HOGAN & SON, General Agents for Eastern and New England States.

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LOCOMOTIVE AND CAR-WHEEL TIRES

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Quality and efficiency fully guaranteed. Prices as low as any of the same quality. We manufacture Heavy and Light Forgings, Driving and Car Axles, Crank Pins, Piston Rods, &c.

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FRANKFORD STEEL COMPANY

FRANKFORD, PHILA., PA.,

STEEL RAILROAD AND MACHINE FORGINGS,

SOLID CRUCIBLE STEEL CASTINGS

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 Best Grades of Tool and Machinery Steel.

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Iron, Steel or
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**ARMOR
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UP TO 18 INCHES THICK.
 GUARANTEED TO STAND
 ADMIRALTY TESTS.
 STEEL OR IRON PLATES
 FOR MERCHANT VESSELS
 OR YACHTS.

Galvanized
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 (Patent Levelled).
 Only Manufacturers



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PLANET Brands.

Open Hearth Steel.

SHIP PLATE, TANK, BOILER, FLANGE and FIRE-BOX.

INDURATED FIBRE PAIL.

LIGHT!
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No Hoops to drop off!
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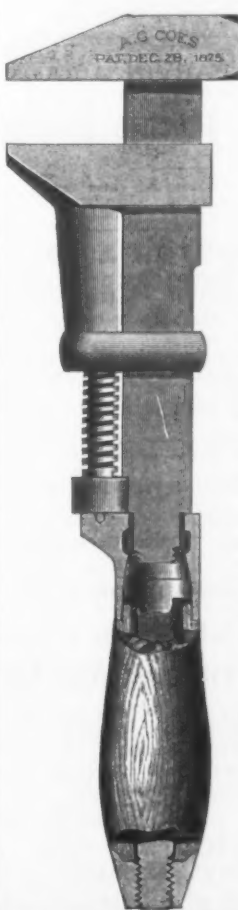
SEAMLESS!
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Established in 1839.



A. G. Coes & Co.,
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 MANUFACTURERS OF
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 SCREW WRENCHES,**

The Strongest Wrench made, and the only successful re-enforced bar. The Ferrule is firmly secured in place by a nut screwed on the bar. Particular attention is called to the way in which the handle is made and fastened to the shank.

This Handle is made better and stronger than heretofore by using our new Cup Tip at the end which encloses the wood and keeps it from splitting. This is the only wrench which has the wood handle firmly secured and held together at each end, and it will stand more rough usage and last longer than any now made. It is not affected by heat, cold or moisture.

None Genuine unless Stamped,
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Bemis & Call Hardware & Tool Co.

PATENT COMBINATION WRENCH.

Case-Hardened Throughout. Parts Interchangeable.

This Wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the requisite adaptations of a regular Sat Wrench, thus making a combination which has no equal.



No. 3 PATENT PIPE WRENCH.

The serrated jaws of the Wrench are interchangeable; that is, the same serrated plate may be used for either the stationary or sliding jaw, so that if one plate is broken another can be furnished adapted to either jaw with out express designation. The slides, nuts and various parts are also interchangeable, thus easily repairing the Wrench at very small expense, and with as perfect practicability for further use as when the Wrench was new. For Circulars and Price List, address

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LEAN & BLAIR,

Engineers and Contractors,

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will contract to erect, equip and place in operation Open-Hearth and Bessemer Steel Works, Blast Furnaces, Lash Steel Melting Furnaces, Hainsworth Soaking Pits, Fire-Brick Hot-Blast Stoves, Gas Works, &c.

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GENERAL AGENT FOR

Whitwell Fire-Brick Stoves

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Clapp-Griffiths Patents for Manufacture of Soft Steel,

SPECIALLY ADAPTED FOR A No. 1 BOILER PLATES, BOILER RIVETS, WIRE RODS, STAY BOLTS, STAMPING WARE, NAIL PLATES.

Will contract to completely erect, equip and place in operation Blast Furnace Whitwell Stoves and Steel Plants as above. As I manufacture at our own works everything appertaining to Blast Furnace and Steel Works construction, can guarantee promptness and satisfaction.

WROUGHT IRON

BOILER TUBES.

Steam, Gas and Water Pipe, Oil Well Tubing, Casing

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LINE PIPE.

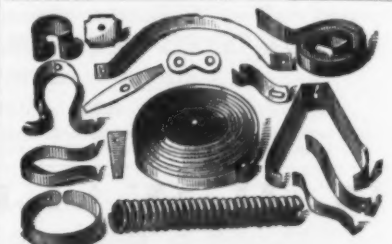
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 Manufacturer of
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Manufacturers of
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 of every description, from best Cast Steel.
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"Right Speedy"
 CORN SHELLER.

Will shell the largest and smallest corn perfectly. It is the best Hand Sheller made, and I warrant it for 5 years.

Price \$5, or handsomely nickel-plated \$6.

AGENTS WANTED. I will send Sheller, express paid, on receipt of price. Send for circular. Liberal discount to dealers.
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SILVER & DEMING MANUFACTURING CO.,Salem, Ohio,
U. S. A.MANUFACTURERS OF
CISTERN, PITCHER, WELL and
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FORCE PUMPS.Latest, Cheapest
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Force Pumps,

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The most perfect and non-

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MYERS' FORCE-PUMPAdapted to open and drilled wells. The
only double acting force-pumps furnished
with expensive plunger bucket and Glass
Valve-Seat. The only successful
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Simple, durable, powerful, easy to operate.

Never affected by frost.

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Double and single har-

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Fig. 120.



Fig. 209.



Fig. 70.

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We also manufacture

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ANCHOR NAILS AND SPIKES. BRAND

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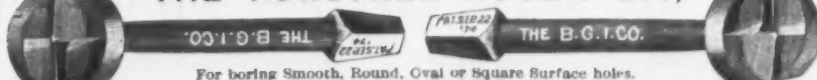
Made from their own Pig Iron, insuring Regularity and Superiority in Quality.

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FOUNDRY AND FORGE PIG IRON,**AND COLD BLAST CHARCOAL CAR WHEEL IRON.****OLD DOMINION CUT NAILS, BAR IRON.****R. E. BLANKENSHIP, President.**

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NOW BUILDING A TWO-CONVERTER BESSEMER STEEL PLANT.

THE FORSTNER AUGER BIT,

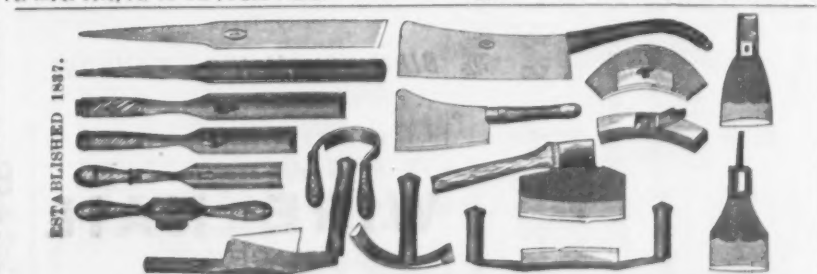
For boring Smooth, Round, Oval or Square Surface holes.

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Coopers', Carpenters' and Ship Tools, Plane Irons, Cleavers, &c. Full Line Chisels.

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TRADE PUBLICATIONS.**Special Tools.**

The W. F. & John Barnes Company, of Rockford, Ill., have issued two very interesting catalogues, one of them devoted to their special machine tools, embracing drills, lathes, emery grinders, &c., while the other contains illustrations and descriptions of their well-known foot-power machinery. Both catalogues are attractively arranged, and contain information of interest and value to intending purchasers.

Upright Engines and Boilers.

An attractive little eight-page pamphlet devoted to upright engines and boilers has just been issued by H. M. Seiple, of Third and Arch streets, Philadelphia, Pa. The engravings are colored prints, and show a number of different styles of engines and boilers and a combination of the two. Brief descriptions are given with extensive tables of dimensions from which intending purchasers can very readily get a fair idea of what would meet their requirements in the way of a small upright plant. Prices are also added.

Paper Cutting Machines.

George H. Sanborn & Sons, 69 Beekman street, New York, have just issued a catalogue devoted to their various styles of paper cutting machines, presses and other devices in this line of machinery. It is very fully illustrated, and gives the descriptions, price lists, and in some cases also dimensions which may be found useful. We find engravings of eight different forms of cutters, also a cut of a self-acting grinding machine for grinding paper-cutting machine knives, another of a paper cutting press, and several illustrations of gauges and clamps, card cutters, &c.

Railway Specialties.

We have before us the first catalogue issued by the Sheffield Velocipede Car Company, of Three Rivers, Mich., and have examined it with a great deal of interest. It is principally devoted to velocipede cars, though in addition, illustrations are given of a number of other railway specialties. We find engravings of one and two-man cars, telegraph cars, combination and inspection cars, and the well-known forms of section and gang, hand and push cars. The descriptions which are given are unusually complete, and in connection with the engravings will be found of great interest.

Thrashing Machinery.

The J. I. Case Thrashing Machine Company, of Racine, Wis., send us their illustrated catalogue of thrashing and farming machinery generally. It covers 32 pages, and is profusely illustrated with engravings of grain elevators, portable and semi-portable engines, traction engines, boilers, pumps, &c.

Printing and Folding Machinery.

John J. Clause, 114 Market street, Chicago, Ill., has issued a very attractive catalogue devoted to printing and folding machinery. It is made up almost entirely of plates of his different forms of presses and folders, and will undoubtedly prove interesting to those familiar with this line of machinery.

Machinery Supplies.

A very interesting catalogue has just been issued by the N. O. Nelson Mfg. Company, of St. Louis, Mo. It is designated as Catalogue No. 12, and embraces nearly 500 pages; is profusely illustrated and full of interesting and valuable information to the trade. The lists which are given have been carefully revised and corrected up to the date of publication. An interesting feature of the catalogue, and one which we think will be generally appreciated, is a carefully compiled index. This is of the utmost importance in a catalogue of this size, and those having occasion to look for any particular class of machinery will feel grateful for the convenience which has been offered them in this form.

Centrifugal Pumping Machinery.

A new catalogue for 1887 has been issued by the Lawrence Machine Company, of Boston, Mass. The specialty of this company we need perhaps scarcely point out is centrifugal pumping machinery, and the catalogue will accordingly be found to contain illustrations and descriptions, tables and other information relating to this class of pumps. In addition to general and sectional views we find engravings and prices of exhausters, valves, ball and socket joints and connections.

Automatic Engines.

A new catalogue has just been issued by the Prospect Machine and Engine Company, of Cleveland, Ohio. It is mainly devoted to their well-known automatic engine, and, like former issues, will be found to contain a large amount of interesting information on automatic engines in general. The theory of fly-wheels, steam economy, piston speeds, &c., is treated of in several chapters. The theory and practice of the steam indicator is also set forth in an interesting manner, and the space devoted to it has been well utilized. We note also that the company are making the double and single sheet steam boilers, to which prominence was first given a few years ago.

Agricultural Machinery.

One of the most extensive publications in the line of trade catalogues which has reached us within the past few months is the blue book issued a short time since by the L. M. Rumsey Mfg. Company, of St. Louis, Mo. It is known as Catalogue No. 40, and embraces 645 pages. It is almost entirely devoted to agricultural machinery, and is fully illustrated with engravings of the different appliances in this line. The particulars which are given are mainly in the shape of dimensions, weights and prices,

and cannot fail to be of interest and value to the trade and intending purchasers. Descriptive particulars are given in only a few instances, but where they are lacking the character of the engravings makes any detailed explanation unnecessary, giving the examiner a very fair idea of the nature of the machine referred to and of its general construction and method of working. The catalogue moreover is very fully indexed.

The Porter-Hamilton Engine.

William Tod & Co., of Youngstown, Ohio, have sent us a very interesting catalogue devoted entirely to the well-known Porter-Hamilton engine. General and detail views are given, together with very full descriptions, and special prominence is given to the advantages of the engine as compared with other types. To power users generally the catalogue will prove a welcome source of information.

Steam Engines, Boilers, &c.

D. B. Cruikshank, 243 Dyer street, Providence, R. I., has issued a long list of steam engines and boilers and other machinery which he now has for sale. It includes engines of a number of different types, such as Corliss, Babcock and Wilcox, Greene, Fitchburg and Wheelock engines, Lidgerwood and Kendall & Roberts' hoisting engines, and a large variety of plain slide-valve engines of different makes. In the line of boilers we find upright, horizontal, tubular and locomotive boilers of various sizes. Steam pumps are represented by the Valley Machine Company, Blake, Knowles, Worthington and other patterns, affording a large selection. The list comprises also a number of different forms of wood-working machinery, and finally miscellaneous machinery, embracing engine lathes, power hammers, water-wheels, rock breakers, planers, &c.

General Machinery.

The Kingsland & Ferguson Mfg. Company, of St. Louis, Mo., have issued an attractively arranged catalogue of engines, saw mills and agricultural machinery. It embraces 124 pages, and in addition to illustrations and the usual descriptive matter and tables of dimensions, prices, weights, &c., contains an elaborate telegraphic cypher code for ordering. There can be little doubt that this will facilitate the transaction of business between buyers and the manufacturers.

Drills, Air Compressors and Mining Machinery.

The catalogue for 1887 of the Clayton Air Compressor Works, of Brooklyn, N. Y., was issued a short time ago. Like former issues, it devotes a large amount of space to engravings of the Clayton improved air compressor, showing general and sectional views of the Clayton air governor, pressure relief governor, rock drills, crushers, hoisting engines, &c. The descriptions which are given are more than ordinarily elaborate and will prove of interest.

Shears and Punches.

The Whitcomb Mfg. Company, of Worcester, Mass., are sending out a new catalogue illustrating the shears and punches invented by Mr. Timothy F. Taft and now put on the market by them. The machinery is designed for working both by hand and power, and the different forms in which it is brought out are shown in a large number of engravings which are given in the catalogue. Sizes and prices also are added.

Sawmill Machinery.

E. P. Allis & Co., of the Reliance Works, Milwaukee, Wis., have sent us their new catalogue of sawmill machinery. It is very attractive in its arrangement, and will unquestionably prove of good deal of interest to sawmill men in general. The engravings are finely executed, and together with carefully prepared descriptive matter give the reader a very fair idea of the character of the machinery turned out.

Portable Engines, Sawmills, &c.

We have before us the forty-first annual catalogue of the Robinson Machine Works, of Richmond, Ind. The catalogue is mainly devoted to portable engines, sawmills and several forms of agricultural machinery, engravings and descriptions and the customary lists of sizes and prices being given. Those interested in machinery of this class will undoubtedly find in the publication some material of value.

Steel for Tires.—An extraordinary metallurgical effusion comes from the pen of Ed. B. Metcalf. We cannot quote the whole of his letter to the *American Engineer*, but may quote the following introductory paragraphs as an example of profound diagnosis: "We note quite an inquiry for fresh thought on the subject of bettering the condition of tire metal, physically and chemically. Suppose we start with pouring the metal into the molds, we find that when the 'heat' has been properly cooked the carbon in it is hotter than the iron; it remains hotter, by reason of its refractory nature while cooling, until it combines with a small per cent. of the iron. When the initial temperature is allowed to subside before any work for reduction is done on the metal and fresh heat has to be used for an annealing the skin, then most likely the iron, by reason of its being a fair conductor, gets hotter than the carbide, which, at best, is a first-class non-conductor. This makes two dissimilar elements to deal with under the hammer or in the rolls—95 to 97 per cent. soft ductile iron, the other 3 to 5 per cent. mostly hard carbide forming their cell walls, isolating the atoms of metal, so cohesion is out of the question. Under existing systems the work of fining up the metal is not done till after a portion of the carbon has combined chemically and irrevocably until melted again with a small per cent. of the iron to form an irregularly cellular structure which will keep the shape of the metallic mass, without its weight or strength, after all that is valuable for actual service is eaten out with salt water or weak acid."

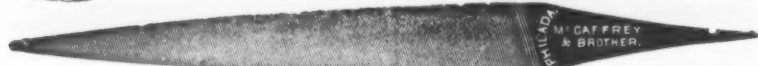
Paris, 1878.

**McCAFFREY & BRO.,**

PENNSYLVANIA FILE WORKS.

Philadelphia, Pa., U. S.

For Superiority.



Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

HOTCHKISS' Improved Rat Killer.



For Sale by all Jobbers.

Packed in 1, 1-2 and 1-4 gross Cases, 1-2 dozen in a Box.

WRITE FOR PRICES AND DISCOUNTS.

JOHN H. GRAHAM & CO.,

Sole Agents,

113 CHAMBERS STREET,

NEW YORK CITY.



This Knife is the **BEST IN USE** for cutting down hay and straw in mow and stack cutting fine feed from bales, cutting corn stalks for feed, cutting peat and ditching marshes. The blade is **Best Cast Steel**, spring temper, easily sharpened, and is giving universal satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for export as well as home trade, and it seems destined to take the place of all other Hay Knives. They are nicely packed in boxes, 1 dozen each of 60 pounds weight, suitable for shipping by land or water to any part of the world.

Manufactured only by
HIRAM HOLT & CO. EAST WILTON, Franklin Co., MAINE.
For sale by the Hardware trade generally.

CAUTION.

We are informed that various parties are infringing upon the widely-known Letters Patent granted originally to GEORGE F. WETMOUTH for an Improved Hay Knife. The invention patented to GEORGE F. WETMOUTH is embodied in a sword-shaped blade provided with operating handles for working the same, the edge of the sword-blade being furnished with knife-edged serrations or teeth. It is our purpose to PROSECUTE ALL INFRINGEMENTS, and to hold every party liable to the full extent of our ability and of the law all parties who manufacture any knife infringing upon the patent, or who deal in the same. Several suits are now pending in the U. S. Courts. All manufacturers and dealers are hereby warned of our rights, and the public are cautioned against purchasing any Hay Knives, made as described above, which are not of our genuine manufacture.

EAST WILTON, Sept. 1, 1886.

HIRAM HOLT & CO.



W.H. CARTER'S PATENT NEEDLE HAY KNIFE.

PAT. APR. 29, 1884.
IMPROVED BY M.M. BARTLETT.
Improvement Patented April 28, 1885.

SOLE MANUFACTURERS OF
NEEDLE HAY KNIFE, THE BEST IN THE WORLD.

Improvement patented April 28, 1885, of which we are the sole manufacturers, has been tested with the most celebrated knives of other makers, and has proved an easier and faster Cutter than any other. Its special excellence consists in the chisel-edge tooth shown in the engraving. It may be used for cutting hay in the mow, stack and bale; also for ditching, cutting peat, or any other work for which a hay knife is used. It can be readily ground by the most inexperienced, as it requires to be ground only on one side. Should a tooth break, all that is necessary to replace the damage is to grind it once and a new chisel-tooth appears. It can ordinarily be sharpened with a common scythe stone. Try one and you will give it the preference.

WIER & WILSON,

Direct Representatives for the South and Southwest of Hubbard & Co., American Screw Co., A. Field & Sons, Oliver Bros. & Phillips, Hartford Hammer Co., The Shelton Co.'s Bolts, Jno. Sommer's Son, Wheeling Hinge Co., J. P. Tolman & Co., Nicholson File Co., The Henry C. Hart Mfg. Co., Braided Sash Cords. Sales confined to Hardware Jobbers.

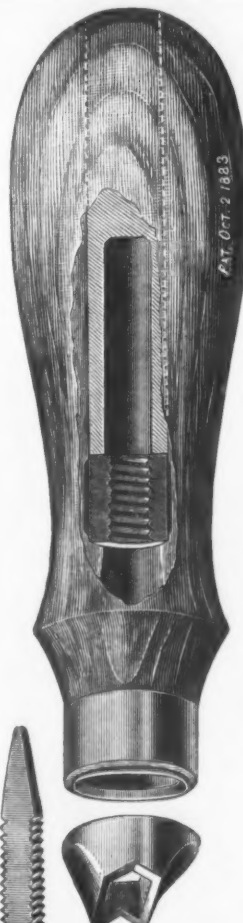
Office, 14 W. German St., BALTIMORE.

TACKS & WIRE NAILS,

BOAT NAILS,
Regular and Chisel Pointed; Black and Galvanized.
SHOE NAILS, &c. &c.

Lining and Saddle Nails, 3d. Fine Lath Nails,

BOSTON SALESROOM, 70 Portland St.
BALTIMORE SALESROOM, 29 Hanover St.
CINCINNATI SALESROOM, 349 Main St.
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AMERICAN TACK CO., FAIRHAVEN, MASS.



THE J. BARTON SMITH CO'S PATENT SCREW TANG FILES

As a guarantee of the superior quality of Screw Tang Files over all others for any that are unsatisfactory as to temper, &c., we will give in exchange two for each one that is returned to us. One Handle will last a lifetime in constant use, making it the cheapest Handle in the World. Cost 10 cents each.

S. A. HAINES & CO., Agents, 90 Chambers St., New York.

J. BARTON SMITH COMPANY, ESTABLISHED 1842.

BLACK DIAMOND FILE WORKS.



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G. & H. BARNETT,

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CHARLES B. PAUL, MANUFACTURER OF HAND CUT FILES,

Warranted Cast Steel.

467 Keap St., Brooklyn, N. Y.

All descriptions of Files made to order. Price List mailed on application.

Established 1863.

EXCLUSIVELY HAND-CUT FILES AND RASPS,
MANUFACTURED BY THE
CHELSEA FILE WORKS, NORWICH, CONN.



The superiority of our Horse Rasps over all others is universally admitted by those who use them, and their high degree of excellence will be scrupulously maintained. Give them a trial, and use no others.



J. M. KING & CO.,

WATERFORD, N. Y.

Manufacturers of the

Button's Pat. Wire Cutter and Plier Combined.

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and MACHINISTS' STOCKS and DIES, PLUG and TAPER TAPS, HAND, NUT and SCREW TAPS, PIPE TAPS and REAMERS.

Price List on Application.

Established by DANIEL B. KING, 1889.

NEW LONDON SCYTHE CO., SCYTHEVILLE, N. H., U.S.A.

MANUFACTURERS OF

THE GEM HAY KNIFE.

Patented July 29th, 1875.

We desire to call especial attention to our patent "Gem" Hay Knives, which are rapidly gaining in favor with the public. They are made from the best Cast Steel, tempered in oil, and their peculiar construction enables the user to do the work with greater ease and rapidly than with any other knife.

Send for Descriptive Circular and Price List.



LIGGETT SPRING AND AXLE CO., LIMITED,

MANUFACTURERS OF

Springs and Axles

For Coaches, Phaetons, Buggies, Wagons, &c.

PITTSBURGH, PA.

RIEHLÉ BROS.

STANDARD

SCALES

AND TESTING MACHINES



RAILROAD TRACK SCALES.
Best and Cheapest.



Cleveland Iron Ore Paint Co.,
MANUFACTURERS OF

PURE IRON ORE PAINTS,

Red (Rosie), Purple and Brown. We guarantee all our paints, and respectfully solicit the patronage of consumers and dealers. Our paints are used largely by the railroads and car builders of our country. Send for Price List No. 15.

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BEST IRON PAINT.

WIRE NAIL MACHINES

HARDMAN PATENT.

Thoroughly Tested and in Successful Operation.

For prices and particulars address the Manufacturers,

BIRMINGHAM IRON FOUNDRY,

FOUNDERS AND MACHINISTS,

BIRMINGHAM, CONN.

THE BEST AND CHEAPEST

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MACHINE,

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WM. A. SWEETSER, Brockton, Mass. (39 Montello Street.)

WALKLEY HARDWARE CO.,

PLANTSVILLE, CONN.,

are putting up special

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Tacks in an original form.

Something new and attractive combined with

good quality and correct

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AWARDED FIRST PREMIUM

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(Four Gold Medals. All other principal makers competing.) Price Scales, Hay Scales, Platform Scales, etc. Important patented IMPROVEMENTS.

BEST VALUE FOR YOUR MONEY. For circulars, terms and full particulars, address

BUFFALO SCALE COMPANY, BUFFALO, N. Y.



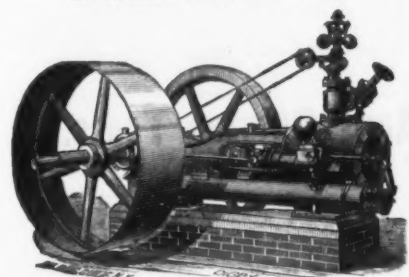
TEMPERED STEEL SPIRAL SPRINGS,

Of all sizes and descriptions, made to order by
John Chatillon & Sons,
85, 87 and 89 CLIFF ST., N. Y.
Our Springs are used by the U. S. Government and various
Meteorological and other Scientific Institutions.

IF YOU WANT A STRONG, ECONOMICAL ENGINE,

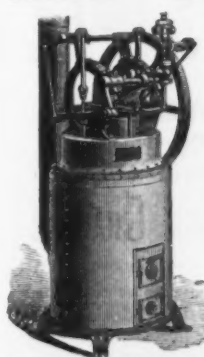
Either HORIZONTAL or VERTICAL,
For steady every-day and all-night service and
at a LOW PRICE, write to

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22 Cortlandt Street, NEW YORK.



Twelve hundred Engines in use.
Please mention this paper.

McKINLEY PATENT AIR ENGINE.



The Best and Cheapest
on the Market.

No Steam. No Water.
Absolute Safety. No En-
ginner. No Pumps. No
Gauges. No Liability to
freeze up. No Regula-
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NO EXTRA INSURANCE.
Can be used for any pur-
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quired.

Cheap Fuel. Cheap
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For further information,
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Manufacturer of

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DIE LETTERS FOR SEAL
ENGRAVERS,
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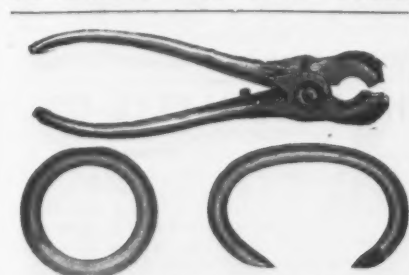
MAYNARD'S
PATENT SOLID CAST STEEL SOCKET

SHOVELS AND SPADES.

Forged from a single piece of Cast Steel, with-
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somest ever made. For sale by

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BLAIR'S PATENT

Hog and Pig Ringer.
Will close Ring outside nose if so desired. Millions
in use. Ring production daily, 80,000.

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CHEMICALS AND APPARATUS

FOR THE ANALYSIS OF

Ores, Iron, Steel, Fuel, Fluxes, Furnace
Gases, &c., our specialty.

Being direct Importers and Manufacturers, we can offer superior
Inducements. Sole Agents for
Trommsdorff's Chemicals; Joseph Kavalier's
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Strictly Chemically Pure Acids and Chemicals.
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ILLUSTRATED CATALOGUE MAILED ON APPLICATION.

THE ROGERS & HAMILTON CO.,

MANUFACTURERS OF

SILVER PLATED WARE,

Waterbury, Conn.

THE BEST GOODS EVER PRODUCED IN AMERICA.

HARTMAN

An Illustrated Price List of Standard
Nails will be mailed to any address. It
shows the different styles of these nails, and
is 2-3 actual size. It is gotten up to take
the place of the bulky sample card which
can not, for several reasons, be as widely
distributed as these cuts. These can be
sent out with each letter and invoice.

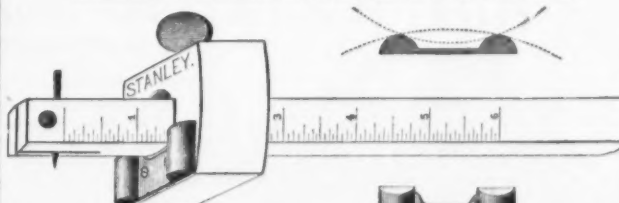
General Office and Works: Beaver Falls, Pa.

BOSTON: 74 India St. NEW YORK: 88 Chambers St. CINCINNATI: 1 and 2 Wiggins Block. PHILADELPHIA: 418 Commerce St. CHICAGO: 72 W. Lake St.
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**STANLEY
Rule & Level Co.**

Manufacturers,
New Britain, Conn.
FOR SALE BY ALL
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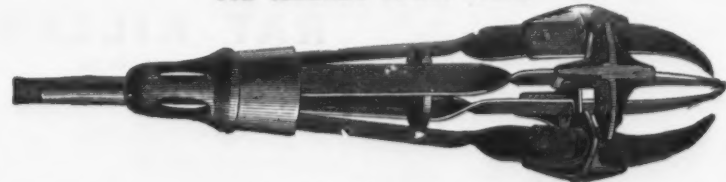
STANLEY'S PATENT FACE-PLATE FOR GAUGES.



The Brass Face, with two ribs
attached to one side of the
head (see cut) will enable the owner to run a gauge-line with perfect
steadiness and accuracy around curves of any degree.

THE NATIONAL STEEL TUBE CLEANER,

FOR CLEANING BOILER TUBES.



ENDORSED BY THE BEST ENGINEERS.

THE CHALMERS-SPENCE CO.,
419 East 8th Street, New York.

PERRINE PATENT

Curved Blade **HOE** Double Shank

Manufactured only by the



CANTON HOE & TOOL CO.,

CANTON, OHIO U. S. A.

HARD WOOD LOCK JAW HANDLES

FOR FILES,

Rasps, Screw Drivers, &c. Locks rigidly; unlocks
readily for continued use; coped locks. Do not
rust or break. Receives all shaped Tangs without
splitting handle.

CABOT COMPANY, Chicopee, Mass.

Failures of Locomotive Crank Axles.

In the Excerpt Minutes of the Proceed-
ings of the British Institution of Civil
Engineers, we find the appended abstract of
a paper on "The Failures of Locomotive
Crank Axles," by E. Sauvage, published a
short time since in the *Annales des Mines*:

Locomotive axles are liable to failure by
fracture through the bearings, the crank-
webs or the crank-pins. Of these, the first-
named is the most rare, and the last the
most common, the fracture usually taking
place at the juncture of the crank-pin with
the web. Sometimes it actually occurs dur-
ing work; but more often the axle is con-
demned on account of an incipient fracture
before it actually takes place. On the
Northern Railway of France, during the
five years 1881-85, there were 58 cases of
breakage, one in the bearing, five in the
web and 52 in the crank-pin. Of these
last, 36 were in the right-hand pin, as against
12 in the left hand pin, while four were not
specified; and no satisfactory reason for
this discrepancy has yet been assigned. During
the same period 100 axles were con-
demned, 93 for cracks and 7 for strained
journals and other causes. It is a matter
of considerable delicacy, and one that de-
pends a good deal on the individual judg-
ment of the inspector, to pronounce whether
a flaw, real or supposed, is of itself
sufficient to justify the condemnation of an
axle.

Various methods of strengthening crank-
axles have been proposed, the chief value of
such contrivances being not so much the
actual prevention of rupture, as the diminu-
tion of danger from resulting damage, by
the retention of the fractured parts in their
relative positions, thus converting the
broken axle into a sort of built-up axle,
while there is no longer the same necessity
for condemning an axle so strengthened on
account of a slight flaw, which may be of
no real moment. The webs may be
strengthened by shrinking upon each of
them a band or hoop, which for an axle of
ordinary dimensions, say, 7 1/2 inches diam-
eter in the body and 7 1/2 inches diameter at
the crank necks, may be about 4 inches
wide by 1 1/2 inches thick. The crank-pins,
where fracture most frequently occurs,
might, it is true, be strengthened by giving
them an increased size of the big-
ends of the connecting-rods, already incon-
veniently large, but would also necessitate
raising the boiler-barrel in a corresponding
degree. By drilling an axial hole 2 1/2 inches
diameter through each crank-pin, it would
be weakened to a very slight extent, while
the insertion of a bolt would enormously
add to its safety; and as such a bolt would
be exposed only to a shearing, and not to a
tensile strain, its full area, and not the re-
duced area at the bottom of the thread,
would be available. If necessary, both the
head and nut of the bolt may be sunk into
the body of the crank-web, the material of
which, at those points, is not exposed to any
strain. The cost of the four hoops shrunk
on the webs is about \$25; that of drilling
and bolting the two crank-pins is about \$8;
and this extra cost is fully repaid by the in-
creased life of the axle.

The Hemp Trade.

The amount of manilla hemp consumed in
the United States during the past year has,
according to a Boston newspaper, been less
than for any year since 1880, the figures
standing at 176,000 bales in 1880; 220,688
bales in 1881; 196,885 bales in 1882; 184,-
483 bales in 1883; 202,173 bales in 1884;
190,960 bales in 1885, and 177,221 bales in
1886. The net importations this year have
been smaller than for any year since 1882,
the figures of the yearly importations for
the same periods noted above being as fol-
lows: 159,594 bales in 1880; 223,136 bales
in 1881; 205,763 bales in 1882; 178,723
bales in 1883; 199,782 bales in 1884; 209,-
478 bales in 1885, and 194,813 bales in 1886.

The stock of hemp on hand the first of
January for the last seven years is as fol-
lows: 1881, 39,940 bales; 1882, 41,791
bales; 1883, 50,699 bales; 1884, 36,192
bales; 1885, 28,948 bales; 1886, 46,453
bales; 1887, 61,700 bales. The cause of the
smaller consumption of manilla hemp this
year is explainable by the fact that there
was a large amount of manufactured stock,
cordage, rope, &c., carried over by the
manufacturers from the previous year. Were
it not for this, the consumption of
manilla hemp would have shown a larger
total as the situation was on the whole
favorable for a heavier consumption.

The exact situation in manilla hemp on
January 1, 1887, may be seen from the fol-
lowing statistics: Stock of manilla hemp
in the hands of importers and speculators on
January 1, 1886, 11,910 bales; stock in the
hands of manufacturers on same date, 34,-
546 bales, making a total stock of 46,456
bales on that date. The total importations
during the year 1886 were 194,813 bales, of
which 179,072 bales came directly from
Manilla, and 15,741 bales came from Europe.
Of this amount 2258 bales were re-exported,
leaving net importations of 192,555 bales,
which added to the stock on hand on Janu-
ary 1, 1886—namely 46,456 bales, gives the
total supply of the year 1886 at 239,011
bales. The stock in the hands of importers
and speculators in New York on January 1,
1887, was 18,246 bales, and the stock in the
hands of manufacturers in New York and
Philadelphia was 26,619 bales, and in the
manufacturers in Boston, 16,925 bales, mak-
ing the total stock in the country on January
1, 1887, 61,790 bales, which subtracted from
the total supply for the year—namely, 239,-
011 bales, gives the total consumption 177,
221 bales.

The statistics of Sisal hemp tell an entirely
different story, the consumption being con-
siderably larger than for any previous year,
the importations being smaller than for
three years past, the stock on hand January
1 being smaller than for four years past,
and there having been during the year a
great advance in prices, which now rule
higher than at any corresponding time since
1886. The reason for this increased con-
sumption and great improvement in price

during 1886 is that there was a good de-
mand for Sisal goods which was stimulated
by the low prices and the low cost of the
raw material.

Foreign Markets.

FRANCE.

PARIS, January 30, 1887.—*Metals*.—Business in
the metal trade in this city has been gaining in
volume, without change in prices. We quote to-
ward the close, in francs, 100 kg.: *Copper*, 107,-
Chili Bars, 102 @ 105; Ingots and Slabs, 108.75;
Best Selected, 112.50, and pure Corrocor Ore, 105,
Tin— Banca, 271.25; Bullion, 270, and Straits,
Austrian and English, 267.50; *Lead*, 33.35, and
Spelter, 38.50 @ 39. *Iron*.—At Saint-Dizier the
fear of foreign complications has exercised but
little influence on the iron trade; works are mod-
erately booked, just about sufficiently so to com-
fortably bridge over the dull winter time. Only
the Nail works are very busy. The Charleville
Nail Works made an important contract with the
owners of the "Lepintee" patent, these new
Horse Nails evidently being destined to compete
vigorously with ordinary makes. In the North,
at Valenciennes, rolling mill owners have been
approached about large contracts on forward de-
livery, but they decline selling distant futures ex-
cept at a material advance. Meanwhile there is
a good demand for railroad material, cars in par-
ticular, and the Northern Railway has just made
a contract with Northern Steel works for Axles.—
Moniteur des Interets Matériels

BELGIUM.

BRUSSELS, Jan. 30, 1887.—*Iron*.—Owners of blast
furnaces have exhibited great stiffness in their de-
mands, in anticipation of higher Coke prices, while
those of rolling mills not having blast furnaces of
their own decline naming prices for their makes,
being afraid of an impending rise in Pig Iron.
This being the case, little has transpired during
the week, everybody being in a hesitating mood
about prices he may sell at a month ahead. For-
merly people used to fall back on Luxembourg,
but the latter can sell in Germany at 4 francs @
100 kg. all the Pig Iron it can turn out. A few
weeks ago Luxembourg was but too glad to be
able to get 3.80 francs @ 100 kg. for the same
iron. Meanwhile Athens sold 10,000 tons Forged
Pig to be delivered during the second quarter, at
4 francs @ 100 kg. Foundry improved 10 centimes
to 4.10 francs. No 3 Luxembourg Thomas Pig
which a short time ago was still selling at 4
francs, has just sold at 4.60. Meanwhile there is
a brisk export demand growing up for Finished
Iron and Steel Rails for Portugal, Brazil and the
Argentine Republic.—*Moniteur Industriel*

GERMANY.

HAMBURG, January 30, 1887.—*Iron*.—The Rhenish
Westphalian Iron market has not only been
rapidly improving under a steadily increasing
demand, but iron masters have abolished, since
the commencement of the year, quite a number
of abuses that had been growing up like mush-
rooms during the deplorable period of depression
when dealers and consumers made the best of
the yielding disposition of makers. Now things
have changed. Pig Iron has been advancing so
precipitately that the impression gains ground
the improvement is too rapid, but the blast
furnace owners are of opinion, seemingly, that
their product will ere long reach considerably
higher figures. Considering the active demand
on the one hand, and the bareness of stock on the
other, thus Forge Pig cannot be had under 50
marks @ ton. Foundry Pig is under control of
the new syndicate. Ten per cent. Spiegel com-
mands 50 marks. In the Finished Iron branch
everybody is booked in full for months ahead, so
that the Sarre and Moselle works, through their
syndicate, have felt induced to raise the price 8
marks @ ton for Merchant, 7 @ ton Rods and 10
marks Hoop Iron. Sheets have been slowest in
improving, with the exception of thin Wire Rods,
which at first caught the spirit of the great
change. Wrought, reluctantly, are rampant now,
especially under the unabating American demand.
Steel Rails may still be had for 130 @ 125 marks.
The general state of machine shops and foundries
cannot be said to be fully engaged; those that are
complain that prices are not remunerative. Car
makers are filling late orders, but have nothing to
show beyond. *Metals*.—Lead and Spelter are
very firm. Copper is higher.—*Borrenkade*

HOLLAND.

ROTTERDAM, January 18, 1887.—*Tin*.—Has been in
better request at 60.75 guilders @ 50 kg. Billiton
spot, and Banca at 61. The latter is offered to ar-
rive at 61.50 without buyers thereat.—*Koch &
Fierboom*

SPAIN.

BILBAO, January 8, 1887.—*Iron Ore*.—Since our
last report quite an improvement has taken place,
Campanil having risen to 7 and Rubios Superiores
to 6.9. Shipments have been light during the
week owing to the bad weather. In spite of the
large contracts recently made for delivery in all
the present year, the demand for more Ore thus
to be contracted is as lively as ever at a time of
the year usually dull in this branch of business at
Bilbao. The most noticeable feature has of late
been the magnitude of the American demand for
Ore that has suddenly sprung up. *Pig Iron*.—
The foreign requirements continue quite ur-
gent, while the domestic demand has slackened for
the moment. Ore shipments since the 1st inst.
have been 23,139 tons, as compared with 61,072
during the first week of last year.—*Bilbao Mar-
time y Comercial*

AUSTRIA.

VIENNA, January 16, 1887.—*Iron*.—If the first
fortnight of the new year has not developed an
extraordinary amount of activity in Austria
Hungary in the Iron and Steel trades, it has cer-
tainly strengthened the firm feeling both in Pig
and Finished Iron throughout the monarchy, espe-
cially in Bohemia where the depression has been
greatest and where the newly-introduced Car-
Wheel industry seems to have an important
future in prospect. On the other hand, the Hard-
ware trade is dull, and the outlook therein is far
from promising. We quote on a steady market:
Pig Iron, 34 @ 40 florins @ ton; Merchant, 117.50
@ 122.50; Sheets, 140 @ 175, and Beams, 105 @
110. *Metals* have been steady, with a moderate
consumptive demand. We quote: Copper, 54.50
@ 56.50 florins @ 100 kg.; Lead, 18.50; Spelter,
18.75; Tin, 131 @ 132; Antimony, 36, and Quick-
silver, 230.—*Handels-Journal*

EAST INDIES.

SINGAPORE, December 30, 1886.—*Tin*.—Since the
8th inst. the price has fluctuated between \$35.37 1/2
@ \$35.10, closing firm, with buyers at \$35.12 1/2.
Supplies are large, and shipments for December
January will be close upon 4000 tons if the
regulate tonnage is available. *Tonnage*.—London
rates for clean cargo are back to 20. For New
York the P. J. Carleton and the Corypheus are
loading, and the Mytic Belle has just been laid on,
at last rates. For Boston the S. G. Carleton has
not yet cleared. *Exchange* is weak at 3/5 1/2 for
six months sight credits. The steamer Cathay took
for New York from Penang 84 piculs, and the
Glennora the same amount, while from here the
steamer Kent took 421 same destination, making
the total from the Straits Settlements to the
United States so far this year 98,979 piculs.—
Guthrie, Wood & Co.

PENANG, December 15, 1886.—*Tin*.—During the
fortnight under review the market opened at
\$35.30, in order to advance to \$35.35, but subse-
quently to recede to \$34.70. Receipts reached 18,500
piculs; Europeans bought 12,600, and Chinese
300.—*Schmidt, Ruestermann & Co.*

CHILI.

VALPARAISO, December 3, 1886.—*Copper*.—There
being little inclination shown by shippers to op-
erate, lower prices have had to be submitted, sales
being restricted to 7167 quintals at from \$16.82 1/2
down to \$16.50, equal to \$28.15 1/2. *Nitrates*.—Pend-
ing the Iquique meeting of refiners little has been
done for Europe and will be done till the future
output shall have been decided upon; but there
has been a brisk American demand, so that be-
tween spot and futures 518,500 quintals have
changed hands. December sales may be quoted
\$2.75, 95 c. Stock in refiners' hands, 100,000 quin-
tals. The price of \$2.65 equals 7/16 per cwt. in
the United States. *Charters for Europe*, 20,500
tons; for the United States, 2800. December ship-
ments for Europe will reach 40,000 tons; to the
United States, 5000. Total shipments in 1886 will
figure up about as follows: To Europe, 365,000
tons; to the United States on the Atlantic, 65,000,
and on the Pacific, 10,000; together 440,000 tons.
Coal is quiet; New Castle, 24 @ 25; Orrell, 28;
Australian, 20 @ 21; Smelting Coal, 30/. *Ex-
change*, 90 days sight, 24d @ 24 1/2d.—*Weber & Co*

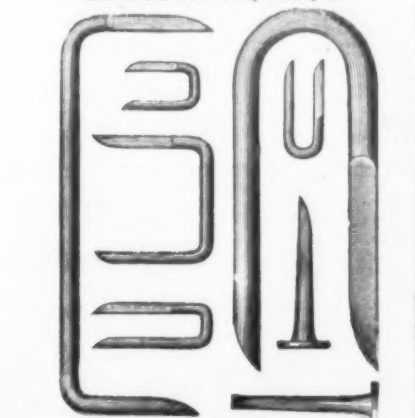
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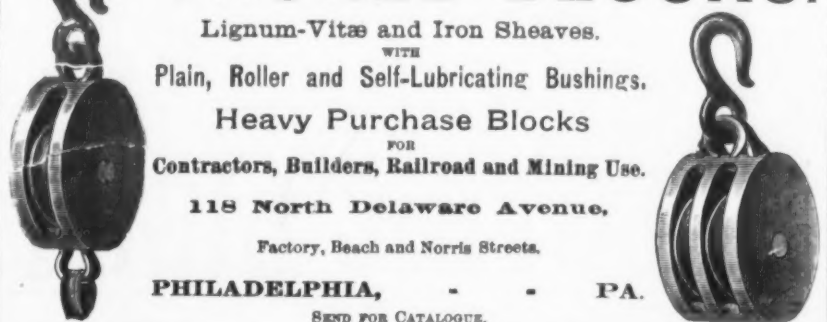
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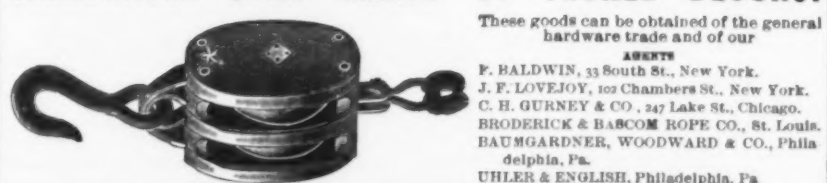
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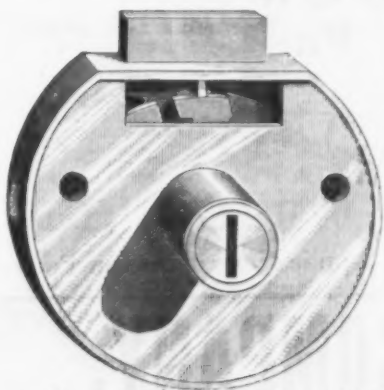


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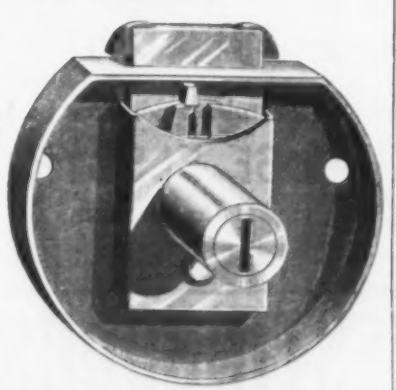
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English Letter.

(From Our Regular Correspondent.)

LONDON, January 17, 1887.

THE REVIVAL.

of trade would seem to be making remarkably rapid progress in this country were one to judge solely by the outward and visible signs thereof. Having had some considerable experience in iron and steel trade matters, however, I am not disposed to place implicit reliance upon "outward and visible signs," but, nevertheless, will take them for what I believe them to be worth. Appreciating these outward symptoms at what I hold to be their true value, I arrive at the conclusion that they are to a great extent the results of fear rather than of facts. The fear is that the markets may rise suddenly and so "catch" various grades of producers and consumers either involved in long dated contracts at the old low prices, or in no position to cope with the exigencies of the market in other respects. The operation and extent of this fear is having natural and sequent results. When any number of men are afraid of any particular incident or contingency, it is a certainty that the whole of them will seek to avoid danger or trouble for themselves by taking some course which they believe will make themselves safe. At the present time, therefore, when the fear of a rapid rise has been fully established, all the consumers are buying ahead so as to cover their own contracts, and as the outcome of their combined operations we have a state of things which cannot be honestly said to be warranted by the known facts as to the relative proportions of supply and demand. Stocks are but slightly lower than they were a month or six weeks ago, and there is no absolute proof that the consumptive demand has as suddenly expanded as the advance in prices would appear to imply. There is a better demand, no doubt, but it is partly owing to the incipient advance in values which took place during the last two months of 1886, and prospects are fairly good, yet one cannot avoid the impression that cause and effect have been to some extent reversed. That there has been a good deal of speculation lately cannot be doubted, and the existence of a determined knot of bulls at Glasgow is equally beyond question.

Seeing these effects, it is not difficult to trace back the whole movement to one dominant cause, which is the revival of trade in the United States. All recent reports from your side, whether by mail or cable, have confirmed the impression that you have entered upon a fresh period of abnormal activity, and that impression has been emphasized and practically exemplified by the receipt of large orders from your market for British pig iron, blooms, rails, crop ends, hoops, bars, plates, wire rods, scrap iron, old rails and other articles, including many kinds of machinery and hardware. In view of these reports and facts, some of the more active and impressionable members of our iron and steel trades have promptly jumped to the conclusion that we are on the eve of repeating our experiences in connection with former 'booms' in the United States. They point out what has happened on these former occasions, and cite the orders already received in proof of their contentions. They endeavor to make the trade and the public believe—whether they believe it themselves or not I cannot pretend to say—that your demand is pretty certain to attain such dimensions as to sweep away our accumulated stocks and so enable us to once more raise our heads and enjoy an epoch of brilliant prosperity. As I do not know, I will not attempt to prophesy, but in default of fuller knowledge I shall be greatly surprised if this strong programme is fully carried out.

I am not unaware of the enormous extension which has taken place of late in your producing powers, and I know also what a vast increase could be made in your active capacity within a few months, consequently, before I pin my faith to the undiluted optimism of which I have spoken, I want to know much more than I know now of the nature and extent of your demand. At the same time I do not desire to shut my eyes to the fact that you have already sent us orders for a very large quantity of materials, and that your inquiries still unsatisfied appears to mean the placing of orders for thousands of tons more pig iron, steel, scrap, and so on. Descending for a moment from the general to the particular, I may add that what I prophesied last week in respect of blooms is coming to pass. As blooms have grown dearer than rails, your people are now asking for rails, and, unless I am misinformed, at least one order for the latter has been placed, the price being said to be £4. 5/ or £4. 6/ per ton f.o.b., or equal to quite \$31. on your side. Our rail mills, however, are now very full of work, and they show a disposition not merely to decline propositions entailing early deliveries, but also seek for appreciably higher prices. Some of these mills have work assured for six or eight months, hence their independence and warrant for augmented values. Hematite pig iron smelters are also full of work, previous orders for the United States being said to have been increased by another for 30,000 tons during the past week. Some of these producers are also out of the market and have withdrawn their quotations. As a some what new feature, too, I hear of heavy buying of wire rods at Warrington, in Shropshire, and elsewhere on American account, the statement being that this has taken place after all has been arranged for that could be obtained from Westphalia. My more detailed reports elsewhere in this report will give you a good idea of our exact situation.

SCOTCH PIG IRON

has been and is very lively and firm, as will be seen by the appended quotations. The local consumption is better and the shipments show a marked comparative increase, amounting last week to 1059 tons, making a total increase to date this year of 3335 tons. Warrants touched 47/7½ on January 13, but closed at 47/2 for the week, as against 39/10 a year ago. There are now 75 fur-

naces blowing in Scotland, compared with 92 this date 1885. In Connal's stores there are 841,54 tons—an addition of 700 tons last week—as against 673,460 tons the same date last year. The importations of Mid-dlesboro' pig iron into Scotland have increased by 2101 tons this year.

HEMATITE PIG IRON

is very stiff, and several makers have withdrawn their quotations, but they may be taken to be about 1/ @ 2/ per ton higher than the figures quoted in my last week's report. Mixed lots of Nos. 1, 2 and 3 are about 48/ @ 49/ per ton, f.o.b. at West Cumberland ports, Whitehaven, Workington, Maryport, &c.

THE IRON MARKET

has not only maintained the position it assumed last week, but has advanced beyond it. Nevertheless no more justification for the spurt exists now than could be quoted a week ago. It is almost an open secret, however, that large purchases for shipment to the Transatlantic market have been made in Bessemer pigs. The Staffordshire market has also shown firmness, and sellers have been able to secure advances upon recent rates. On the whole, a much better condition rules there than has been the case for a long time past. In the finished departments there has been no material advance in prices, unless it is in the commoner brands. Best bars, though in good demand, are not yet realizing better prices. Sheets, both black and galvanized, are in excellent request, and an advance of fully 10/ is being maintained. Hoops, rods, angles, and other kinds of finished iron have not, for the general market, manifested any noteworthy change, the demand being, however, fairly good. For the American market it is confidently reported that during the past week purchases have been made of Cleveland angles at best current rates. Excellent business has been done in scrap iron and in both double headed and flange rails; No. 1 heavy wrought scrap has fetched from 47/ to 52/6; old double heads, 67 6 @ 70/6, and old flange rails, 65/ @ 67/6, all f.o.b. usual ports.

THE QUARTERLY MEETINGS.

At Middleboro' on January 11, the quarterly meeting of the North of England iron and allied trades was very well attended. The market was again much stronger, there being a vigorous demand for No. 3 Cleveland pig iron for early shipment at 37/ @ 37/6 per ton. Higher prices were asked for future delivery. Makers, in fact, were most unwilling sellers, as they anticipate stronger prices. The material rise in the price of ore at Bilbao strengthened the hematite pig iron market. Manufactured iron was steady in volume, but prices were firmer, in sympathy with the rise in raw material. Ship plates were £4. 15/ per ton, angles £4. 7/6 @ £4. 10/, steel ship plates £6. 5/ @ £6. 10/, and steel angles £5. 15/ @ £6 per ton, all less 2½% at works. At Wolverhampton on January 12 the attendance was fully up to the average, and merchants were present from London and Liverpool offering specifications for considerable lines. Makers of finished iron came together with the determination to refuse orders except at better prices. The meeting was animated. There was more excitement in pigs than in finished iron, just as had been expected. Those who were prepared to name terms quoted 39/ @ 40/ delivered to customers works as the minimum for Northampton, and Derbyshires 38/ for Wiltshires, and 42/ @ 42/6 for Lincolnshires. These prices were an advance upon last quarter day of about 4/ on Northampton and Derbyshires, and 3/ on Lincolnshires. Hematite quotations were largely suspended. Native pig iron makers reported themselves very busy and unable to fill deliveries with all the requisite promptitude. Prices were quoted 2/6 per ton on last quarter day, but it was not easy to persuade customers into giving these. All mines were nominally at 55/ for hot blast sorts, part mines were 37/6 @ 42/6, and crown cinder pigs near upon 30/. Makers of common finished iron generally demanded an advance of 2/6 to 5/ per ton. An informal meeting of common strip and hoop makers was held, at which it was decided to advance prices 5/ per ton, making gas strip £5 and common hoops £5. 5/. Sheets presented the best appearance. Makers in this department were in possession of large inquiries from galvanizers, merchants and other buyers. Singles were generally £6 per ton, doubles 6£. 10/, and lattens £7. 10/. Some makers refused to sell doubles except at £6. 15/, and lattens in proportion. Plates were quiet, and prices without much change at £6. 10/ for tank sorts and £7. 10/ @ £9 for boiler quantities. United States orders were reported on the market for plates, bars and strips. At Birmingham on January 13 the market was a strong and excited one, and a further considerable rise was established in most descriptions of pig and manufactured iron, both plain and galvanized. Standard quotations for best Staffordshire pig and marked bars were unaltered, but there was a buoyant feeling all round. It was in the pig iron, however, that the most considerable rise took place, and Northamptonshire, Derbyshire and Lincolnshire showed an average rise of 5/ on the quarter. Hematite were in great demand and very scarce. The list houses adhered to their old standard, £7 for marked bars, with the usual 12/6d extra for Lord Dudley's brand, but nearly all the other descriptions of iron and steel were dearer. Bar makers quoted £6. 10/ instead of £6 for good secondary brands, that being the quotation for Sandwell "brown" bars, and common iron was generally quoted £5. 10/, and in a few cases £5. 5/. Angle makers, who had raised their prices 5/ only a few days previously, demanded a further advance of like amount, making the minimum quotation for this class of iron £5. 10/. Sheet makers quoted £6. 15/ @ £7 for doubles, an advance of 10/ on the week, and of 20/ on the quarter, and the galvanized sheet manufacturers at their meeting decided to advance prices again 10/ all round, making 20/ in all since September. This advance, which makes the price for 24-gauge in Liverpool £10. 15/ @ £11, barely covers the rise in iron, and allows nothing for the advance in spelter, which is from 20/ to 30/ per ton.

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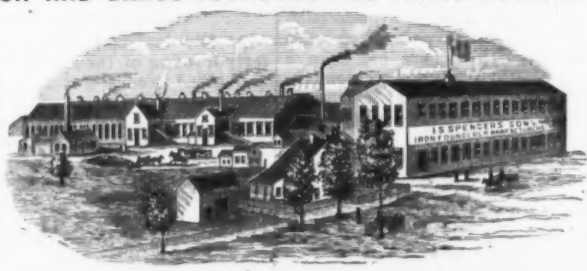
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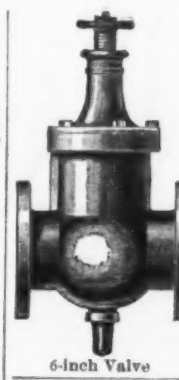
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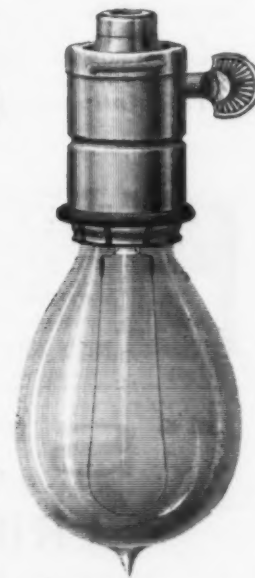
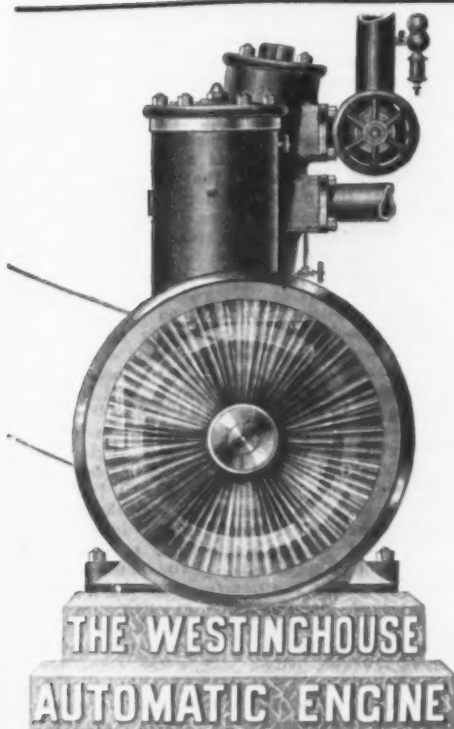
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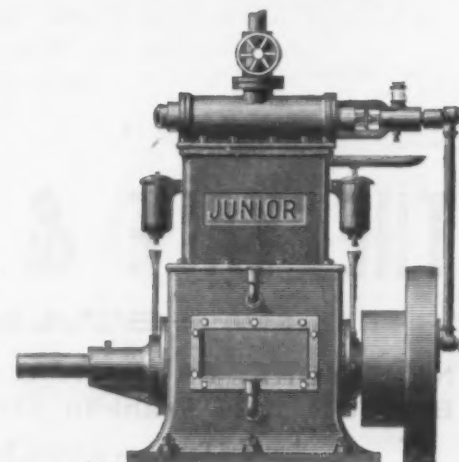
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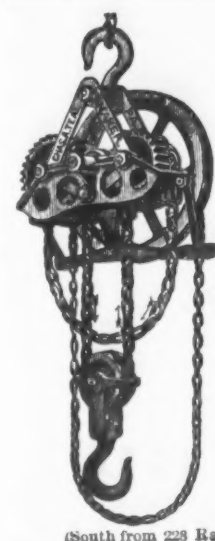
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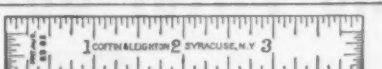
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Original Solid Vulcanite Emery Wheels.

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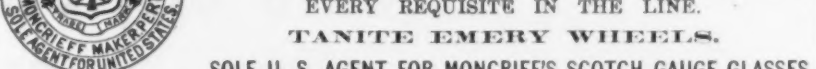
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and Car Castings at lowest rates.

604 Pullman Building, Chicago.

THE WEEK.

In the annual report of the Produce Ex-
change, says the New Orleans Democrat,
special attention was called to the fact that
there was a marked increase in the ship-
ment of food products and provisions from
this port during last year, particularly to
Gulf ports and Central and South America,
and the committee making this report pre-
dicted that this trade promised to increase
very considerably during the present busi-
ness year. It has, as a matter of fact, taken
a far grander boom than was foreseen. A
number of the largest packers in Kansas
City have latterly been experimenting in
the shipment of their products via New Or-
leans, and the result has been highly satis-
factory to them, the returns on each con-
signment by way of this city being much
better and far more profitable than similar
shipments by way of New York and other
Eastern cities.

The whale fisheries of the United States,
as shown by the annual review just pub-
lished, comprises 121 vessels of all classes,
and am units to 28,291 tons, of which more
than one-third is offered for sale. The total
catch yielded about 20,000 barrels of oil and
309,000 pounds of whalebone, and was un-
profitable.

The property known as the Mercer Mining
and Mfg. Company, at Greenville, Pa., was
purchased by Richard Irwin, banker, of
New York, for himself and others for \$228,-
000, and will be known as the Mercer Coal
Company, James T. Blair, president, capi-
tal \$1,000,000.

At the Elizabeth Cordage Works, in New
Jersey, 600 hands were thrown out by a
strike.

Regardless of unfavorable reports from
pioneer expeditions respecting the feasibil-
ity of the project, Hugh Sutherland, presi-
dent of the Hudson's Bay Road, running
from Winnipeg to Hudson's Bay, has an-
nounced that the company will spend
\$4,000,000 the coming year in construction.
The company are having three ships built
at Newcastle-on-Tyne for navigation on
Hudson's Bay, and rails for 200 miles of road
are in process of manufacture. The road
will be completed in two years' time.

Secretary Hotchkiss, of the Chicago Lum-
berman's Exchange, states that the reduc-
tion of stocks of lumber in that city on the
1st Jan., as compared with January 1, 1886,
was 55,665,361 feet, which, adding the re-
duction of 17,000,000 feet at South Chicago,
shows a reduced stock of 72,000,000 feet in
lumber resources with which to commence
the present season.

On the subject of the revival of American
shipping, Ex-Secretary of the Treasury,
Hugh McCulloch, addressed a spirited letter
to the Shipping and Industrial League lately
in session at Washington City, concluding
as follows: "What the United States now
needs is markets for their surplus of manu-
factured goods and of their agricultural
productions, and the question to be solved
is, how shall these markets be obtained?
In no other way, according to my best
judgment, than by prompt action on the
part of Congress can American capitalists
be induced to build ships to compete in
foreign markets with the subsidized ship-
ping companies of other countries. The
restoration of our shipping interest and an
increase of markets for our surplus produc-
tions are now absolutely required to give to
the country, and the whole country, reliable
and permanent prosperity. To aid in
bringing about this result the American
Shipping and Industrial League has been
formed; that its success may correspond
with the importance of the work in which
it is engaged should be the earnest desire of
all who are interested in the country's wel-
fare."

James E. Quinn, the Master Workman of
District Assembly No. 49, Knights of Labor,
was arrested on Saturday. The order of arrest
was issued by Judge Shipman, of the United
States Circuit Court, on affidavits presented
by President McCready, of the Old Dominion
Company, and it included in addition to
Mr. Quinn, J. J. McKenna, T. B. Putnam,
Patrick McGarland and Thomas McGrath,
who constitute the Executive Board of the
Ocean Association of Longshoremen. Quinn
gave a bond for \$5000. Commissioner
Shields took the acknowledgment. The
eighth paragraph of the complaint, which
recites the substance of the cause of action,
says that "in December, 1886, the defend-
ants above named formed and entered into
a conspiracy, with the purpose to hinder
this plaintiff from following his said trade."

The River and Harbor bill, which passed
the House last week by a vote of 54 to 94,
appropriates about \$7,430,000. Some of the
objectionable projects that have appeared
in its predecessors have now been omitted.
The bill contains no legislation touching
the construction of the proposed Hennepin
Canal or providing for the purchase of the
Sturgeon Bay and Portage Lake Canals.

The tinware factory of A. Wolf & Co.,
in the large building No. 53 Hester street,
this city, was damaged by fire to the extent
of \$20,000, and other occupants suffered in
larger amounts.

The "dressed beef monarchs" who have
headquarters at Kansas City and Chicago,
claim to have supplanted the "cattle kings"

of a few years ago in the control of the beef
product of the West, but consumers seem to
have derived little advantage, as prices of
dressed beef in New York have undergone
no perceptible change, although the prices of
cattle on the plains have declined within a
few years about 40 per cent. The Chicago
shippers known as the "big four," are said
to know every ranch on the Western plains.
They can estimate just what is likely to be
the extent of any particular cattle-growing
section, and we are told that when the hardy
growers from Montana and Wyoming arrive
with their range-fed cattle at the purchasing
and slaughtering centers "these four men
so arrange matters as to make the producer
think that, after all, ranching is not the
most profitable business in the world." The
dressed beef of cattle bought in Chicago by
this combination is now supplied in enor-
mous quantities in New York and adjacent
cities. New England towns are large con-
sumers.

Resolutions have been introduced into
both branches of the Legislature at Albany
calling upon Congress to favor the erection
of defensive works in New York harbor and
the deepening of the channel at Sandy Hook,
in accordance with the recommendations of
the President's message. The New York
Produce Exchange took action to the same
effect.

One-half interest in the large fire-proof
building in Buffalo, known as the Coal and
Iron Exchange, sold for \$100,000.

Speaking of the great prosperity of United
Italy, Professor R. Lancisora, of Rome,
now in this country, stated that his friend
Baron Von Hoffman, of New York, pur-
chased a villa near Rome just before
"unity" for \$80,000, and last year was
offered for the ground alone \$2,400,000.
The great drawback is the lack of fuel for
manufacturers who are compelled to make
use of water-power to a great extent.

The New York Underground Railway
Company, in which Edward Lauterbach
lately obtained a controlling interest, is said
to be ready to commence work as soon as
permission to obtain the streets is granted,
\$3,000,000 having been raised for this pur-
pose. Among those interested is a number
of prominent bankers. The contract for
construction has been assigned to the United
States Subway Company, which now con-
trols four corporations possessing rights for
underground roads, and these will be merged
into a common interest, which proposes to
gridiron subterraneous New York. The
present charter only admits of a two track
road, which will be built on the automatic
ventilating system, and will occupy a space
underground 15 feet deep by 35 wide, which
will be divided into two tunnels. The di-
rectors say they can begin work at once as
they have no legal contest to delay them,
and their plan is approved by the majority
of the property holders along Broadway.
The wide-reaching plans of the company
also contemplate the simplification of the
transportation of freight between this and
adjoining cities.

It is estimated that the vessel tonnage on
the stocks at the different shipyards along
the great lakes is larger this winter than at
any time within the past 15 years. Buffalo
is more than holding her own in the heavier
class of vessels, while in tug-boat and canal-
craft construction she is far in advance.

The Pennsylvania Railroad is about to
try a few miles of permanent way laid in
the present English style, bull-headed steel
rails, with heavy cast-iron chairs, the ties
being spaced further apart than is usual
here, only some 2000 being used per mile.
The increased weight of the company's roll-
ing stock is understood to have led to this
step.

Two companies have been incorporated
at Albany to build railway connections be-
tween the Poughkeepsie bridge and the
nearest lines of track. One of these
links, to form a junction with the Wallkill
Valley Railroad, will be 20 miles in length.

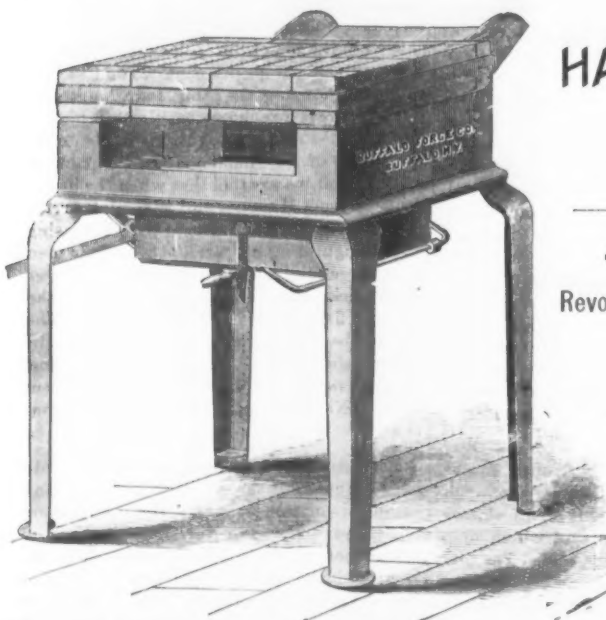
A curious suit has been developed in the
Superior Court at Baltimore against S. Ruth
& Son, tin can makers, by Assembly 1384,
of the Knights of Labor, who claim \$20,000
damages for violation of contract. The de-
fendants, it is alleged, contracted to pay the
union scale of prices from April 1, 1886, for
one year, which they failed to observe, thus
throwing many men out of employment and
causing their support to be a charge upon
the assembly.

Natural gas has been successfully piped
65 miles—from Franklin, Pa., to Youngs-
town, Ohio. At the latter point the pressure
is 180 pounds; at the wells 540. Meadville,
Oil City and Sharon are supplied from the
same source.

The only obstacle said to exist to the
threatened diversion of packing-house prod-
ucts from the New York route to the new
experimental route from Kansas City to New
Orleans and thence to Liverpool is said to
be the absence of shed protection on the
New Orleans wharves, which the city coun-
cils refuse to give.

At the operating rooms of the Western
Union Telegraph Company in this city there
is now to be seen what is called the largest
circuit railway for carrying messages in the
United States. The machinery is almost the
same as that used in shops for conveying

BUFFALO HEATING FORGES



FOR
HARD COAL
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COKE.

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Revolving Shaker Grates
AND
Blast Gate.

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Ten Sizes
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FOR ALL CLASSES OF WORK.

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TAPS

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in. Wrought-Iron
Pipe Size.

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Both their Patent Lock and
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Adjustable
HANDLES.

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OILERS,

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We have the largest and best facilities for furnishing
the best quality of work and promptly.

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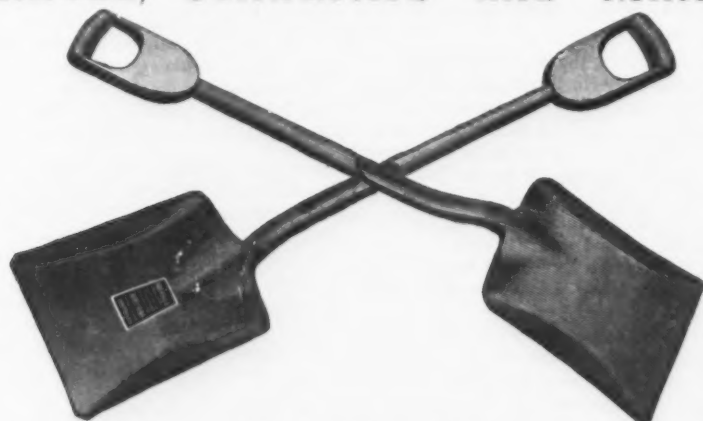


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STONE

WEDGES.

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OF
MALLEABLE IRON.

Hammer's Adjustable Clamps.



Hammer's

Malleable Iron Oilers, 3 Sizes.
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NEW Pattern Heavy Screw Clamps.
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Gate City Stone Filter Co.,

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Disc and

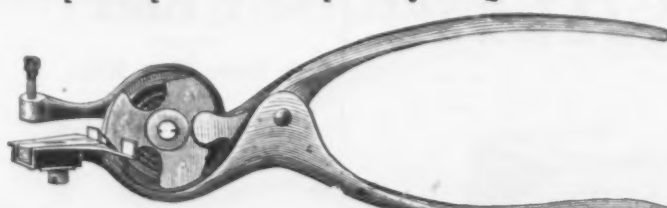
Patent Ice Chamber.
By this arrangement the fil-
tered water is cooled with-
out mingling with the ice.

Cheap Stone Jar Filters for the kitchen. Fine Porcelain (with Ice Chambers) for
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Borthwick's Patent Rotary Saw Set.



EXAMINE THE PRINCIPLE, as illustrated in cut. NOTICE ROTARY ACTION, by which a perfect
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SEND FOR CIRCULAR. UPRIGHT DRILLS.

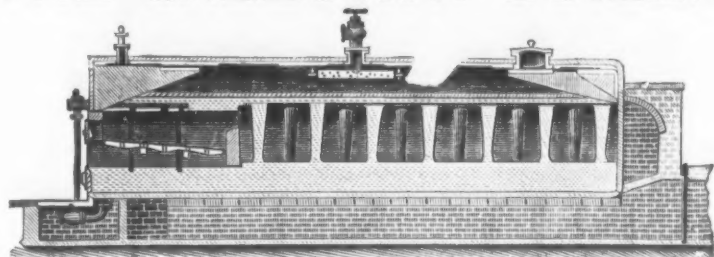
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Either Right or Left.



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Greatest Durability, Large Steam and Water Spaces,
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McLEAN BROS. & RIGG will always be glad to receive advices of goods suitable for sale in Australia and New Zealand, and their experience in those markets is always at the disposal of manufacturers.

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Send for Illustrated Catalogue and Price List. No charge for Samples.

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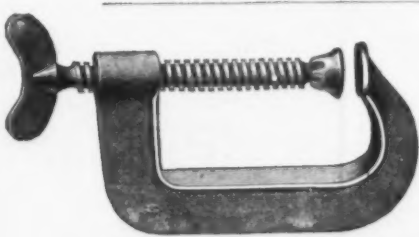
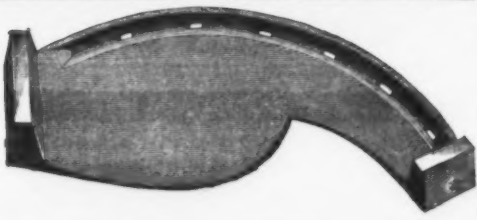
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Six Sizes Each. Blunt and Sharp Calk.



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Coach & Carriage Hardware & Fine Mountings
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Bristol Pattern Harness Snaps, Tinned.

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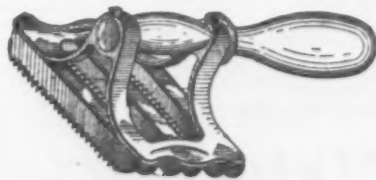
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The Original Inventors and Manufac-
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cash. There are thirty tramways of wire leading from the central station to the smaller stations, and each wire has a holder in which the dispatch is placed. A force of fifty boys and girls transfer the messages from the tramways to the different boxes.

The results of thorough organization on the part of workmen are vividly portrayed by a contemporary, who says: "A few coal-handlers are dissatisfied and are ordered to quit work. Their employers strive to fill their places and are likely to be successful. When the efforts to break the heads of these new handlers are thwarted by their armed protectors the boatmen are ordered to strike, so that the coal loaded by the non-unionists shall not be taken away. When new boatmen or new boats are found, then they are not allowed to land at our docks. When a landing is forced, and hands are found bold enough to discharge them, the carters must strike so that the coal cannot be taken to the yards, nor delivered to the poor shivering people who are waiting to buy a basketful at the grocery. If delivered to a steamer it must not go on board. If forced on board, the longshoremen strike and will give the steamer no cargo." Unfortunately the description too nearly agrees with the actual facts.

The New York superintendent of State prisons will need this year \$2,000,000 to keep the 2500 convicts employed under the "State account" system. Last year he used \$1,300,000 in this manner, every dollar of which he returned to the State Treasury from the proceeds of sales of manufactured goods. The "State account" system was a success, much to Mr. Baker's surprise. The ledger of the prisons showed a surplus instead of a deficit, as had been expected. But the workingmen complain that the State account system puts the convicts into just as much competition with them as the abolished "contract labor" system did. Accordingly Senator Low introduced a bill drawn up by the State Workingmen's Assembly which would limit the convicts to working in quarries and forbid any product of their labor being sold.

Large additions to the navy are contemplated by bills in the hands of the Naval Committee for presentation to Congress. Chairman Herbert's bill provides for the expenditure of \$4,920,000 in the construction of two 6000-ton cruisers, four 1740-ton cruisers, and one torpedo boat. Mr. Thomas also has a bill pending before the committee which he will seek to have adopted. This bill appropriates \$5,800,000 for two cruisers of 4000 tons each, after the pattern of the Newark now building; five gunboats on the model of gunboat No. 1, and six sea-going steel torpedo boats of the Stiletto type, but 150 feet in length and capable of a speed of 24 knots an hour. There are also other bills of like nature waiting action by the committee, including Mr. Lawler's bill appropriating \$50,000,000 to be disbursed by the Secretary of the Navy in new constructions.

Mr. Hewitt's bill authorizing the construction of a bridge across the East River to Long Island has been favorably reported in Congress.

A brother of the banking firm of J. & W. Seligman, of this city, who was examining a mine in Montana, where the firm had a large interest, found himself held as a hostage for the payment of \$75,000 alleged to be due the miners, and was not released until Governor Hauser guaranteed the payment of the amount.

The total valuation of Pittsburgh for 1887 is officially stated to be \$134,731,000, which is an increase of \$3,074,000 compared with 1886, and this despite the impediments caused by strikes in the building trades last spring.

Important discoveries of iron ore in Westmoreland, Pa., are announced.

An exhibition of the Cleveland Manual Training School was given in that city last week. It was established a year ago by a number of prominent business men and is now in full operation. The machine shop when completed, will consist of lathes, planers, drill presses, milling machines and vice benches for chipping and filing. The forge shop contains the forges and anvils of the juvenile smiths. Here ten boys were busily engaged in bending, welding, upsetting and drawing iron. In another department the boys are taught in plain and carved wood turning. Like the others mentioned, the carpenters' shop is fully equipped.

Jay Gould has just returned from a thorough tour of the Wabash system of railroads, and gives a cheerful description of the labor outlook. He apprehends no more strikes. "The disturbing elements," he says, "have been very thoroughly weeded out. To a very large extent Eastern, and especially New England men, now operate the Wabash system, and they are contented, and are working toward the same ends as their employers—namely, the success of the railroads which give them their living." The Interstate bill, if it becomes a law, Mr. Gould says, will put an end to the enlargement of his roads in the Southwest.

A telephone line between Brussels and Paris has been successfully worked.

An Ottawa dispatch says the Canadian Government has received assurances from England that war vessels will co-operate with the Dominion cruisers in the enforce-

ment of the fishery protective service, and a cabinet minister is quoted as saying that "two years hence the splendid Yankee fishing fleet will be a thing of the past."

The New York Subway Commissioners have received applications from electric light companies for permission to lay 151 miles of trenches, of which 88 miles are for the Edison company.

Mr. Field says the steel and iron for the proposed branch lines of the Manhattan Elevated Railroad is being manufactured.

A fire in the ordnance machine shop, in Washington City, destroyed casting patterns valued at \$15,000.

Two beautiful yacht cannon, for Vanderbilt's yacht Alva, have been finished by the Strong Firearms Company, in New Haven, Conn. About 1300 pounds of metal were used in their construction, and the price paid was \$1500.

William Gardner, the famous gun inventor, recently died in London, where he was superintendent of a large factory engaged in the manufacture of his weapon.

The Italian Minister of Marine has concluded to purchase the cruiser Salamina, so that next summer the Italian navy will consist of four large ironclads, Italia, Lepanto, Dullio and Dandolo; four powerful cruisers, a smaller cruiser, the Emo; five old ironclads, the Affondatore, Ancona, Maria Pia, Castelfidardo and San Martino, of the Tripoli, and about 50 torpedo boats.

A dynamite explosion occurred on board the Dominion steamer Guyandotte when off Long Branch on Monday afternoon, bound for Norfolk, Va. The source of the explosion was a bag secreted in a closet near the stern, and the effect was to break up the decks and destroy joiner work to the value of \$1200. A fire which immediately ensued was extinguished by the steamer's pumps. It is an unfortunate coincidence for the strikers that it was the President of the Old Dominion Company who caused warrants to be issued for the arrest of the strikers against the company's steamers.

An extraordinary movement in favor of "free shops" was initiated last week by the shoe manufacturers of Worcester, Spencer, North Brookfield and Brookfield, Mass. Under the new terms of engagement workmen are expected to ignore the Knights of Labor, or, in other words, to be influenced by no labor organization whatever. The men must agree to work 10 hours a day under the appointed foreman or overseers of the firms with which they hire, and the manufacturers reserve the right to hire and discharge men as they may deem it best for their own interests. The laborers must obligate themselves to work one year, except in the case of giving a reasonable notice of the desire to discontinue the contract, to be agree to by the employing firm. The men must also agree to have nothing to do with any strike or interference with the prosecution of labor by other men. On these conditions men can go to work, but upon no others. In the factories designated goods were turned out last year to the extent of \$15,000,000. A serious disturbance in the shoe trade is expected.

Strikes are multiplying, and the coal-handlers' strike in New York has grown to huge proportions, affecting many departments of business. Several industrial establishments in New York and vicinity have closed from lack of fuel, and the number must rapidly augment unless there is speedy relief. The word from headquarters is that all Knights of Labor employed in New Jersey on the Pennsylvania and New Jersey Central railroads have been called out, including freight handlers, brakemen, yardmen and station laborers, and not unlikely will produce just such a blockade as resulted from a similar movement on the Southwestern railway lines last spring. The Old Colony line of steamers is already laid up. The Jones Milling Company, in this city, ceased running on Monday night. At Naugatuck, Conn., the Goodyear India Rubber Glove Mfg. Company have partially shut down, and several mills at Fall River cannot run much longer. A strike of 1700 dyers at Paterson, N. J., is threatened. On the other hand, the terms offered by P. Lorillard & Co. to their employees in Jersey City have been accepted and all hands have resumed.

Several changes in the Dominion Cabinet took place last week, Sir Charles Tripper becoming Minister of Finance in place of Mr. McLelan, who in turn is made Postmaster-General.

San Francisco made substantial gains in her industries during the past year. The Commercial Herald says: "The total value of San Francisco industry for 1886 cannot be placed at less than \$95,000,000. Prominent among the industries that may be said to have leaped into being during the year was that of steel shipbuilding. The future of this promising industry may be announced settled by the obtaining of the contract to build one of the Government cruisers. This will give employment to a great number of men, and help the company to renewed exertion. Our rolled iron industry last year represented an output of 20,000 tons; it will be 30,000 this year. We have started the manufacture of steel from the crude ingots, and it promises to be very successful. Our nail and tack factories, &c., were highly prosperous, and we have started the manufacture of horseshoe nails."

H. L. GREEN & CO.,

IRON AND STEEL

BARS, RODS, SLABS, RAILS, SHEETS, PLATES,

Hoops, Bands, Nails.

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For Screening Ore,
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AND
HEXAGON.



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Of all kinds and sizes.

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For all kinds of Ores.

Elevators, Malt Kiln Floors, Grain Dryers, Threshers,

Separators, Corn Shellers and all kinds of Grain Cleaning Machinery; also for Mining and Concentrating Works; Coal, Coke and Ore Screens; Gas and Water Works; Paper, Woolen, Flour and Oil Mills; Filters, Strainers, Ventilators, &c. Special attention given to work for Railroads and Car Builders. Perforated Tin and Brass of all sizes. Iron, Steel, Copper, Brass and Zinc punched to any size and thickness required.

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MECHANICAL.

Multiple Drilling Machine.

We show on this page a multiple drill having eight spindles all entirely independent of one another as regards rotation or feed. All are provided with power feed, having three changes, and so arranged that it may be made as fine or coarse as the user may desire by simply changing the relative sizes of a pair of change gears. All the spindles are, moreover, provided with a quick return lever at the left of the spindles. This lever can be moved through the butt in which it is held, thus enabling the operator to vary its length and use it for light drilling or other work. It is secured against slipping by a thumb screw. The spindles are arranged in sets of four, each

quantities were found to be in the ratio 7 to 9. Another series of experiments was undertaken with a ballistic hammer in which the ratio of the weight of the anvil to that of the hammer was as 4 to 1; with this proportion the efficiency of the ballistic hammer was found to be as great as that of one with a firmly bedded anvil having 20 times the weight of the hammer. In practice the weight of the anvil should be for forging iron eight times and for forging steel 12 times at least the weight of the hammer.

Test pieces of as nearly as possible the same quality and dimensions as those previously used were subjected to a steady pressure in Professor Gulliver's testing machine, and the work required to produce a certain compression compared with the energy necessary to cause the same by means of a blow. The ratio of the latter to the

and 1 inch long to 12 inches diameter and 12 inches long. It is heavy and strong, and all wearing parts are of hardened steel.

The Strength of Fly-Wheels.

The bursting of a fly-wheel, says the *Engineer* (London), is usually due to a failure on the part of the governor to prevent undue acceleration of the engine. A fruitful cause of such catastrophes is the breaking down of the gear by which the governor is driven. The governor ceases to revolve, the balls fall together, the throttle-valve or its equivalent is thrown wide open, the engine races and the fly-wheel bursts. To overcome this difficulty the governor is sometimes so made that when it stops and the balls are in their lowest position the throttle-valve is closed. In order to start the engine the throttle valve is disconnected from the governors. As soon as the engine has acquired its proper speed

That is to say, if each segment were held to the shaft by a wire, the strain on that wire would be 495 pounds. Let us suppose that our fly-wheel is 12 inches wide by 10.8 inches thick, then the conditions will be precisely the same as that of a boiler with a shell 18 feet in diameter and 10.8 inches

thick, submitted to a pressure of $\frac{495}{12} = 41\frac{1}{2}$ pounds in round numbers per square inch.

Now, it may be worth while here to explain that in calculating the strength of a boiler, it is right to regard it as composed of halves, and to calculate the bursting strain on each in terms, not of the semi circumference, but of the semi diameter. For a mathematical demonstration of the truth of this proposition, we may refer our readers to Wilson on "Steam Boilers," Chapter II. In the case of our fly-wheel then we have a

before more than a revolution had been made, half the wheel dropped into the pit, while the other half turning over, fell with a crash on the crank and connecting-rod, and so smashed up the engine. Several cases are on record in which wheels have gone to pieces entirely through the failure of the centers in the dowels. A fly-wheel is now and then looked on as a very unscientific and simple piece of work, but its proper construction and use demand something more than a superficial acquaintance with certain natural laws, and ignorance or neglect of these laws may result in loss of life and serious destruction of valuable property.

The Kimble Engine.

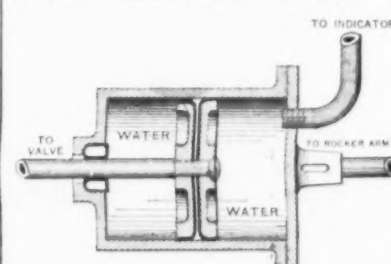
A unique form of steam engine has been brought out by the Den Bleyker Mfg. Company, of Kalamazoo, Mich. It is known as the Kimble engine, and is chiefly peculiar because of the fact that it has neither piston nor piston-rod proper. No cross-head is, moreover, used, and there are no guides, circumstances which are claimed to effect an appreciable reduction in friction.

In place of a piston the engine has a wing supported on an arbor making only $\frac{1}{4}$ turn at each stroke, and there is no piston-rod slipping in and out the full length of the cylinder through a tightly-packed stuffing-box. The wear and friction on the wing-packing are not great. The packing consists of three strips fitted in the edges of the wing, held to the top and sides by the pressure of six small coiled springs. There is very little friction on the rock shaft in the steam-chest. The wear on the crankshafts is said not to be unequal, because there are disk cranks at each end. The connecting-rods, two in number, are simply single bars of steel without straps, grips or keys. The joints are tightened or loosened by single bolts passed through jaws, and secured by lock and nut, the brass being open enough on top to take up reasonable wear on the pin, and allowing a free distribution of oil over its surface.

One feature in this engine which the builders claim further reduces friction is the fact that the push and pull are direct, and not at an angle. The engine occupies but little floor space, is provided with an automatic cut-off, and, we are told, can be placed in the upper stories of buildings, and run at very high speed without injury to the structure. It is claimed to give good results for marine, locomotive, mining, and general working purposes.

The Friction of Slide-Valves.

In the article on "The Friction of Slide-Valves," which we published in our last number, the engraving of the measuring device to which reference was made was



Testing Device for Slide-Valve Friction.

unfortunately omitted. We take pleasure, therefore, in supplying it this week. Its arrangement and function will be readily understood and require no further description.

A New Heel-Trimming and Burnishing Machine.

The Rockingham Machine Company, of Exeter, N. H., have recently brought out a new machine designed for finishing the heels of boots or shoes, making either a burnished or a bright wax heel as desired. In the machines hitherto put on the market, the action of the burnisher has been around the heel, the shoe or boot being moved forward or backward in order to cover the whole of the heel, while the burnishing tool, moreover, was kept hot by means of gas, gasoline or steam. In the machine to which we refer the necessary degree of heat is obtained by the friction of the tool on the heel, and the burnishing is done up and down the latter, the burnisher being carried round while the shoe is held stationary in the jack. The burnishing tool has rotary, reciprocating and oscillating motions, and is capable also of vertical motion controlled by a spring in order to press the tool upon all parts of the heel. The boot-jack is novel in being so arranged that, while one shoe is being burnished, another is being adjusted. In this way the capacity of the machine is greatly increased. The wax is applied to the heel automatically, and a small buffing wheel is attached. The capacity of the machine is, we understand, from 1200 to 1500 pairs of shoes a day, according to the skill of the operator.

Torpedo Vessels of Europe.—The following data show the relative strength of European States in torpedo vessels and boats of all classes and dimensions:

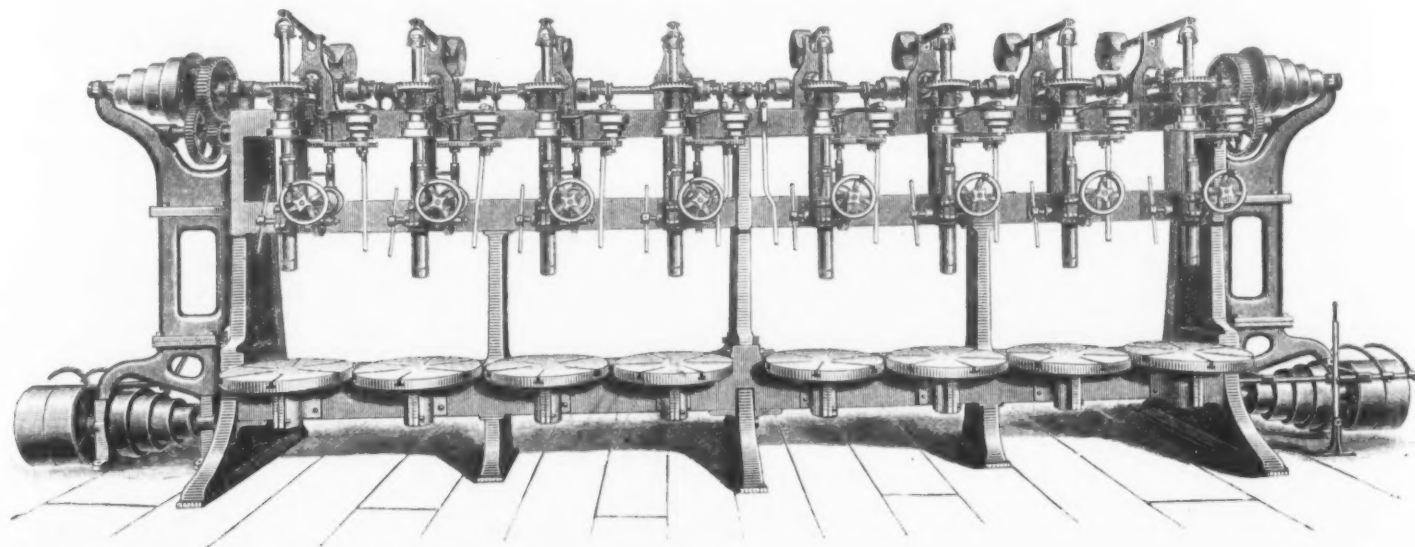
	Torpedoes.	Tons.	Cost, £.
Great Britain	152, representing 23,402	1,450,000	
France	123, representing 20,470	1,255,000	
Germany	150, representing 14,597	900,000	
Russia	115, representing 5,104	312,000	
Italy	83, representing 7,936	500,000	

It appears by the above figures that the average cost per ton—about \$300—of British and French torpedo boats is the same. The principal difference between Great Britain and France consists in the superiority of the former in torpedo vessels of 38 to 40 m. in length, France possessing boats of only 25 to 30 m.

The following is an authentic record of the work of the Baldwin Locomotive Works during the past 10 years:

Year.	Tot. No. built.	No. Exp'd.	Year.	Tot. No. built.	No. Exp'd.
1877	185	39	1883	557	181
1878	292	79	1884	429	170
1879	348	90	1885	342	69
1880	517	53	1886	550	87
1881	551	89			
1882	668	119	Total	4,227	896

The *National Car Builder* estimates the total construction of all the works in the country at 1802 locomotives.



MULTIPLE DRILLING MACHINE, BUILT BY PRENTICE BROS., WORCESTER, MASS.

set being driven from a transverse shaft at the back of the machine, which is provided with a four section cone of large diameter and back gears. This shaft imparts rotation to the spindle through a very simple, efficient and easily working friction coupling. Each spindle is accurately balanced by means of the link, lever and weight shown at the top, and is so held in the quill that it is impossible for it to drop suddenly, as the point of the drill begins to break through the metal at the bottom of the hole. The machine shown will drill without straining a 2-inch hole out of solid steel and other metals proportionately.

The builders, Prentice Bros., of Worcester, Mass., make their multiple drills with as many spindles as desired, with heads that are stationary or can be moved to any desired distance from center to center, 8 inches ordinarily being the smallest distance, though they have built machines in which the spindles approached to within 3 and 5 inches of one another. The feed can be made independent or not as desired, and the table either as shown in the cut or running the entire length of the machine. The drills are built of all sizes corresponding to the single spindle machines of the same makers which range from 12 to 50 inches swing. The first of the style of multiple drills shown was built for the Silver and Deming Mfg. Company, Salem, Ohio, and is in use at present and giving great satisfaction. The machine which we illustrate is at the works of McConaway & Torley, Pittsburgh, Pa. The weight of this machine is 11 tons.

Determining the Weight of Anvils for Vertical Hammers.

According to an abstract of a paper in the excerpt minutes of the proceedings of the British Institution of Civil Engineers the question as to the weight which an anvil should have is one which may often occur in practice. The difference between that which is called static pressure and blows or impact lies in the time occupied by their action. The weight of the hammer and the distance through which it falls determine the total energy expended, but the force of the blow with a given expenditure of energy depends on the compression produced in the piece struck; the less the compression the greater the force of the blow. Some experiments were made by Prof. Fr. Kiek and recorded in the *Technische Blätter* for the purpose of comparing the effect produced by an ordinary hammer striking on a firmly bedded anvil and a so called ballistic hammer where both hammer and anvil are suspended pendulum fashion, so that the anvil is free to move. It has been proved for various materials that within tolerable wide limits the work expended on changing the form of a piece resulting from a blow depends only on the product of the weight of the hammer by the height of fall, the limits for the latter being $\frac{1}{2}$ to 3 m. (1 foot 7.69 inches to 9 feet 10.14 inches). The test pieces used by the author consisted of small cylinders of copper cut from the same bar and of the same original dimensions. One series of test-pieces was subject to blows of a certain energy from an ordinary hammer, while on a second series the same energy was exerted by a ballistic hammer. The weight of the anvil to that of the hammer for the latter was in the ratio nearly of 2 to 1. The length and diameter of the test pieces were respectively about 16.9 and 12.5 mm. (0.66 and 0.49 inch), and the weight about 18.4 grams (0.64 ounce). The results showed that a greater alteration of form was produced by the ordinary than by the ballistic hammer; in the case of the latter the energy transferred to the swinging anvil could be easily ascertained, and was found to be about 30 per cent. of the energy exerted by the hammer. Further experiments were made with the same apparatus to determine the energy of the blow required with the ordinary and ballistic hammer respectively to produce the same effect on similar test pieces; the

former proved to be about 1 to 5, but this value varies according to circumstances, being greater for very hard substances and for repeated blows. At least 20 per cent. of this excess of energy is transferred to the anvil and the remainder lost in vibrations of the latter and of the hammer or in heating the work.

Automatic Power Seaming Machine.

Messrs Gordon & Gilbert, 218 Newstreet, Philadelphia, have brought out a new automatic power seaming machine for the manufacture of sheet metal can and box bodies which combines in one operation all that is ordinarily done by the use of brake, groover and horn press. At the same time the working parts have been so simplified that the machine does not require a skilled mechanic to operate it, as a small boy, after very little practice, can work it as well as a man, and can seam from 10,000 to 20,000 bodies in ten hours.

The engraving which we present will convey a fair idea of the general character of the machine. The cam or box body, being cut to proper size, is placed by the operator

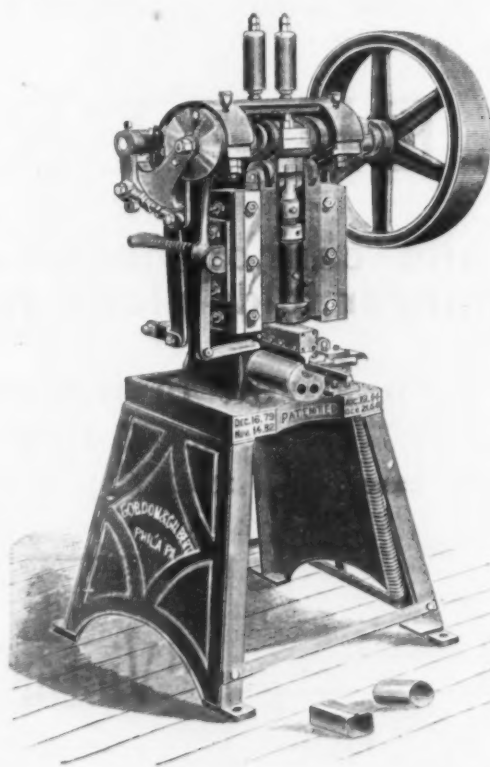
the connection between the two is re-established. Fly-wheels, however, burst now and then without any failure on the part of the governors; and there can be no doubt that they are often run within an inch of their lives, especially in iron works, where very many wheels are driven at a great pace in order that they may have momentum enough to overcome the resistance offered by the iron to the rolls. We propose to say here something on this subject which may serve to open the eyes of certain of our readers to the dangers which they incur.

The centrifugal force tending to burst a fly-wheel is very easily calculated. It operates in all cases radially, and can be resolved into a circumferential strain in more ways than one. That which we shall use in the following article is not that usually adopted, but it possesses we think, several advantages. Assuming that the rim is symmetrical in cross section, then the circle of rotation will fall half way between the inside and outside of the rim. The centrifugal force will be found by multiplying together the radius of the wheel, its weight, the number of revolutions

tending pressure of 41 pounds per square inch exerted over a surface equal in width to the breadth of the fly-wheel rim, and in length to the diameter of the wheel. The first dimension is 12 inches; the second is $12 \times 18 = 216$, and $216 \times 12 \times 41 = 106,272$ pounds. But there are two sections of the rim to sustain this, because, before the wheel could be fairly broken in two, the rim must be torn asunder in two places. Therefore, the tending strain on any section of the rim will be half 106,272 pounds, or 53,136 pounds. As the section is 130 square inches, then the strain will be $\frac{53,136}{130} = 409$ pounds nearly.

As two tons per inch is considered to be sufficient tensile stress to put cast iron, it will be seen that our fly-wheel has a considerable margin of safety. As the centrifugal force increases as the square of the velocity, if the number of revolutions was doubled, becoming 140, instead of 70, stress would reach 1636 pounds. If the speed reached 280 revolutions, the stress would be 6544 pounds on the square inch, or considerably beyond the limit of safety. We have entirely neglected the assistance which the arms give, and properly so. The arms, by setting up initial strains in cooling, are often a direct source of weakness instead of strength. A fly-wheel must depend for strength on its rim, and if this is not ample then the wheel is unsafe. When it is borne in mind that the rims, especially of large wheels, are usually cast out of very common cheap iron, that they may be full of blowholes, and that the cross-section is sometimes made up of moldings and fillets of very variable thickness, it becomes obvious that a large factor of safety ought to be always allowed.

We once heard it urged that if a wheel of one section was too weak, it was easy to improve it by adding on to the pattern, so as to put more metal in the rim. This is a mistake into which founders sometimes fall. It is enough, however, to mention the error to correct it. The bursting strain is a function of the weight of the rim, and any addition to the cross-section must augment the weight, and therefore the stress, in just the same proportion. A wheel may be strengthened by casting it as a disk, great care being taken, however, that it is cooled very slowly and equally to prevent contraction strains being set up, which will sometimes burst such a wheel when it is put in the lathe to be bored. A far better plan is to hoop it with wrought iron or steel. We augment the section in this way, it is true, but with a metal about three times as strong as cast iron. Such expedients, however, are only applicable to small fly-wheels, such as those fitted to plowing and traction engines, which are sometimes run at dangerously high speeds. It is easily shown that there is a certain velocity of rim which must not be exceeded. Thus, for example, the wheel which we have cited has a circumference of 56.5 feet, and makes 70 revolutions per minute, or 66 feet per second very nearly. At this the wheel is quite safe. If the diameter were halved, then the number of revolutions might be doubled and the wheel would still be safe, because the velocity of the rim would remain 66 feet per second. A speed of 80 feet per second is generally regarded as about the highest at which it is safe to run a fly wheel, but this velocity is often exceeded in rolling mills. We have said nothing concerning the method to be adopted in securing the halves of a wheel to each other, such as by dowels and cotters, or hoops shrunk on or bolts and nuts. It is not necessary to do more than call attention to the necessity which exists for making these very strong. It must not be forgotten that when heavy wheels, such as those used in sheet mills, sometimes weighing as much as 60 tons, are used, there is a very great strain brought on the bolts, &c., by the weight of that half of the wheel which happens to be below the shaft, in addition to the stress caused by centrifugal force. One case is mentioned in which just after an engine had been started,



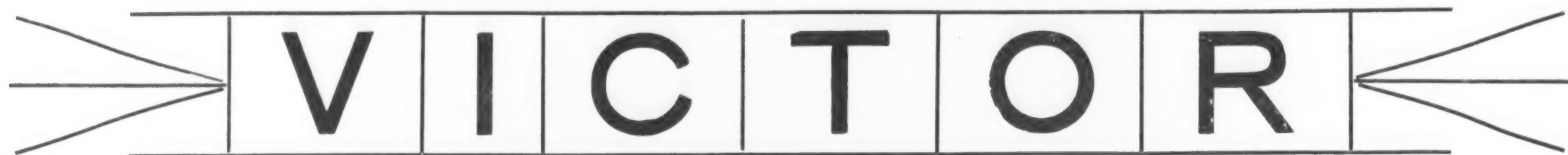
AUTOMATIC SEAMING MACHINE, BUILT BY GORDON & GILBERT, PHILADELPHIA, PA.

on the horn or mandrel of seams, with one edge overlapping the other. The overlapping edge rests against a guide, and the lower edge rests against a seam-forming blade which projects above the surface of the horn or mandrel, and has a sliding movement through the latter. While held in this position the operator starts the machine. The vertical slide then descends, pressing the lapped edges over the seaming blade, and forming them into a hook shape. After being thus formed the sliding blade is drawn back, and the hooked edges are bent over by the tucking slide which is pushed in from one side and over the top of the horn. The tucker is then withdrawn, the hammer descends and sets the seam and immediately returns, allowing the seam-forming blade to return to its first position and discharging the seamed body, leaving the seaming horn ready for another operation.

The machine is made in several sizes, suitable for seaming bodies from 1 inch diameter

squared, and .00034. Let the weight of a wheel rim be 10 tons, or 22,400 pounds, let the mean radius be 9 feet, and the revolutions 70 per minute. A little calculation will serve to show that the cross-section of the rim must be about 130 square inches. We are entirely neglecting the weight of the arms and boss. The action of centrifugal force will be precisely the same as that of steam tending to burst a boiler, because the steam acts radially, just as centrifugal force does. We may imagine the whole rim to be cut up into very small segments, and each held to the center by a wire. If any wire broke, the segment previously held in place by that wire would fly out. Instead of wires, the fly-wheel rim is held together by the cohesion of the segments. The wheel rim may be conceived as cut up into segments, each with a mean thickness of 1 inch, and weighing about 33 pounds. The centrifugal force will then be $9 \times 33 \times 70^2 \times .00034 =$ omitting fractions, 495 pounds.

ANTI-FRICTION

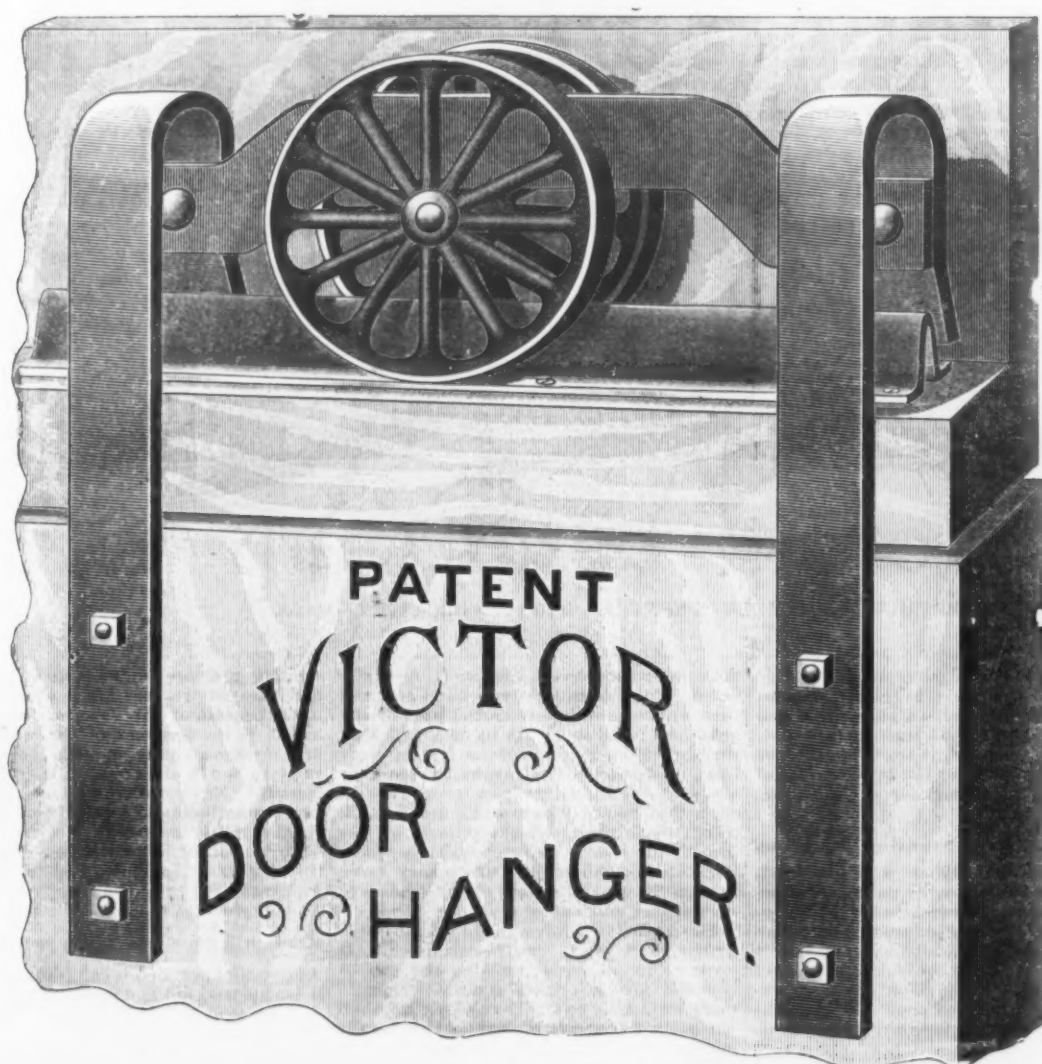


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THIS CUT SHOWS ONE-HALF SET HANGERS ATTACHED.

Hanger and Rail made of Wrought Iron, in a Thorough Manner, and Fully Warranted.

DOOR CANNOT BE DERAILED.

The Hanger-Wheel runs on flat of track and cannot become cramped or broken, and has no Flanges to break. Hanger folds nicely for packing.

No. 1, FOR DOORS TO RUN 6 FEET.

No. 2, FOR DOORS TO RUN 9 FEET.

No. 3, FOR DOORS TO RUN 12 FEET.

No. 4, FOR DOORS TO RUN 16 FEET.

Packed: Hangers, one dozen pairs in case; Rail, 200 feet in case.



TIDY UMBRELLA HOLDER.

By the use of this device, umbrellas may always be kept in place, giving the room a tidy appearance. It may be attached to the wall, on the inside of a closet door, or any other convenient place. All the drips are caught in the cups, which can be readily removed to empty. The loops are made of wrought metal, nickel-plated, and the cups nicely japanned. Packed one dozen in each box, with screws.

Per dozen sets \$6.00.
Sample mailed to trade for 50 cents.

IT WILL SELL.


CORRESPONDENCE
INVITED
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ADJUSTABLE
"Victor" Stay or Guide Roll.



Per dozen (nicely japanned), - - \$2.00.

This Stay Roll is made (except the wheel) of wrought metal. It has the widest range of adjustment required. May be attached to uneven surfaces, each arm being independent. It is made NEAT, STRONG, and is desirable.

VICTOR MFG. COMPANY,
NEWBURYPORT, MASS.

LARGE HEADS. CHAMPION CITY HEADS.



Horse Nails

Manufactured from very best SWEDISH METAL. Will not split. Are accurately pointed, tough, strong and hold the shoes. Soft enough to clinch readily; stiff enough to drive without bending. All nails uniform and perfect. They are used in thousands of shops with the best of satisfaction, and are especially liked by "floor-men" for their good, reliable driving.

Made in two patterns, "LARGE HEADS" and "CITY HEADS."

QUALITY GUARANTEED.

LIST:

Nos. 4 5 6 7 8 9 10
50c. 28c. 25c. 23c. 22c. 21c. 20c.

CHAMPION HORSE NAIL CO., Appleton, Wis.

ROBERTS' PATENT ADJUSTABLE FLY SCREENS

FOR WINDOWS.

BY FAR THE BEST MADE.

Get List and Order ONLY "Roberts'."

PAINE, DIEHL & CO.,
PHILADELPHIA, PA.

LIGHT GRAY IRON CASTINGS
IS OUR SPECIALTY.

WE HAVE VERY GREAT CAPACITY, QUALITY EXCEPTIONAL.

We have, in connection with our Foundries, machine shop for all kinds of light work.

Also Japanning and Nickel-Plating Works of our own.

CORRESPONDENCE SOLICITED.

The Taylor & Boggis Foundry Co.,

65 CENTRAL WAY, CLEVELAND, OHIO.

JESSE JONES & CO.
No. 615 COMMERCE ST.
PHILADELPHIA, Pa.



SHelf BOXES

MADE OF WOOD WITHOUT NAILS OR SCREWS.

SEND FOR CATALOGUE.

PAPER BOXES ALL KINDS FOR HARDWARE.

A TAKING NOVELTY. **"Beacon Hill"**



MOUSE TRAP

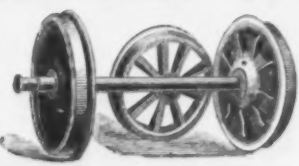
Always Baited. Sure to Catch.

SEND 10 CENTS FOR SAMPLE.

RIPLEY MFG. CO.,
UNIONVILLE, CONN., U. S. A.

Knoxville Car Wheel Co.

Manufacturers of
CHILLED WHEELS
OF ALL KINDS,
With or Without Axles.
KNOXVILLE, TENN.



THE CELEBRATED
Carter County
Cold Blast
Charcoal Iron
IS USED EXCLUSIVELY BY
THIS COMPANY.

"THE PRINCESS" WARDROBE HOOK.



No. 100, Fine Polished Brass,
gross \$16.00.
Discount, 70 and 10 per cent.
Perfection for the purpose and
very handsome. No sharp edges, no
pointed acorn, no knob to prevent
the easy removal of anything hung
upon it, no rust to injure garments.
Will hold 200 pounds.

THE WIRE GOODS CO., WORCESTER, MASS.

Bright Wire Goods. Tassel Picture and Bangle Hooks, and Specialties in Wire. Wire Nails of all kinds and sizes.



CANNON'S POINT NAIL SET

PATENTED MAY 19, 1885.

A great improvement over the old style. Prevents slipping from head of the nail. Made of best quality Tool Steel. Carefully tempered. Appreciated and bought at sight by all mechanics. Prices on application. Made only by

The Edward Storm Spring Co., Limited, Poughkeepsie, N. Y.

MANUFACTURING.

Iron and Steel.

The sale of the Elmira Mills to the Union Bridge Co. is denied. It is stated that the report grew out of the sale of 100 shares by Mr. Pratt to Kellogg & Maurice. The mills closed down on Saturday on account of scarcity of coal.

W. H. Everson & Co., of the Scottsdale Iron Works, Scottsdale, Pa., have just completed and started a new sheet mill with six trains of rolls, adapted for making their sheet iron. They are now building a 15-inch skelp mill, which will be completed in about a month, and will have a capacity of 75 tons a day. These two additions will employ about 100 men on double turn.

It is authoritatively announced that the second payment on the indebtedness of Oliver Bros. & Phillips and of the Oliver and Roberts Wire Company, of Pittsburgh, due under the agreement made with the creditors, will be paid on February 4. The amount of this payment, including the principal and interest at 6 per cent., is \$323,000. With this payment two fifths of the indebtedness will have been liquidated.

There was an important advance made in the wages of the employees of the National Tube Works, McKeesport, Pa., last week. The laboring men, about 1600 in number, were, after a long conference, advanced from \$1.25 to \$1.40 a day, and the employees of the threading department were advanced from \$1.40 to \$1.70 per day.

The annual election of officers for the Glasgow Iron Company, of Pottstown, Pa., was held on the 27th ult., with the following result: President, Comly B. Shoemaker; treasurer, Joseph L. Bailey; secretary, J. Howell Leeds. Directors: Comly B. Shoemaker, Joseph L. Bailey, Edward Bailey, Ephraim Fritz, Benjamin H. Shoemaker.

The employees of the pipe mill of the Reading Iron Works, at Reading, Pa., were some time ago granted an increase of wages, but it was not satisfactory, and a strike which would affect 800 men was threatened. This has been averted by the granting of another increase in wages, and the men now express themselves as satisfied.

It is stated that Robert L. Walker, of Warren, Ohio, and a number of capitalists will purchase a tin mill at Pittsburgh, and remove it to Warren in the near future. We doubt very much the accuracy of this report, and give it for what it is worth.

On the morning of the 24th ult. a battery of four steel boilers burst in the bar mill of Spang, Chalfant & Co.'s works at Etna, near Pittsburgh, damaging the structure to the amount of about \$10,000, killing two persons and injuring eight others. The boiler inspector has pronounced the cause of the explosion to be defective steel used in the construction of the boilers. The mill will be rebuilt at once.

The annual election of the Potts Bros. Iron Company, of Pottstown, Pa., resulted as follows: Chairman, Geo. H. Potts; secretary and treasurer, Henry C. Hittner; managers, Geo. H. Potts, Joseph D. Potts, Henry W. Potts, Henry C. Hittner.

A serious accident occurred early last Thursday morning at the South Chicago plant of the North Chicago Rolling Mill Company in the breaking of the 50-ton fly-wheel of the engine running the blooming train in the rail mill. It will probably take a month to repair the damage and have a new wheel manufactured. In the meantime the mills will close down for their general annual repairs, instead of a month later, as was intended. The blast furnaces are running as usual.

All departments of Carnegie, Phipps & Co.'s steel works, at Homestead, Pa., which have been closed down for several weeks making repairs, resumed operations in full on Monday, the 31st ult.

The Gadsden Alabama Furnace Company have been organized and capitalized at \$200,000, for the immediate building of a 100-ton blast furnace at Gadsden, Ala.

Carnegie Bros. & Co., of Pittsburgh, will this month commence work upon a new rail mill at their Edgar Thomson Steel Works. It will not be an addition to the present mill, but a substitute. The present mill has not sufficient capacity to roll the entire product of the converting department.

It is reported that the Lawrence Furnace Company, of Ironton, Ohio, will erect an additional stack adjacent to their present furnace plant.

Two important blast furnace projects of interest to Cleveland parties are announced this week. Another stack is to be added to the Central furnace of the Cleveland Rolling Mill Company. The capacity of the new stack will be about 175 tons per day. Gordon, Strobel & Laureau have been awarded the contract for the hot-blast stoves to be connected with it. W. J. Rattle, of this city, has leased the Pilot Knob furnace in Iron County, Mo., and will run it on Bessemer iron from Pilot Knob ore.—Iron Trade Review.

At the annual meeting of the board of directors of the Bellaire Nail Works, at Bellaire, Ohio, held at the office of the company on the 29th ult., a cash dividend of 5 per cent. was declared. Mr. J. R. McCourtney, who has been president of the company for a number of years, tendered his resignation, which will be accepted. He will be succeeded by Mr. James Wilson, who at present is salesman for the company.

The steel plant of the Ohio Iron Works, Zanesville, Ohio, has been badly damaged by fire, which was discovered on the 22d ult., and which originated in a cinder bank on which the works were erected.

On November 22 of last year furnace "F" of the blast furnace plant of Carnegie Bros. & Co., at Braddock, Pa., made the unparalleled run of 354 tons of pig iron in 24 hours. This record was beaten on Thursday, the 27th ult., when the same furnace made a trifle over 414 tons, making the

record for this furnace 74 tons in one day more than has ever been turned out from any furnace in the world.

The furnacemen employed by the Sharon Iron Company, at Sharon, Pa., have received an advance in wages of 10 per cent. to date from February 1.

Extensive improvements are being made at the Twenty-ninth street mill of Carnegie, Phipps & Co., Pittsburgh. The puddle department and large plate mill were closed down last week, and the work of placing in a new engine has been commenced. The work will be continued night and day until it is completed, which will be about March 1st.

The new spring and axle department of the steel works of Singer, Nimick & Co., Limited, is nearly finished. It will be remembered that this department was completely destroyed by fire some time ago.

The establishment of a co-operative general store among the employees of the Hartman Steel Company, Limited, at Beaver Falls, Pa., which was noted in these columns some time since, is now taking definite shape. It is proposed to carry \$20,000 worth of stock, to be held in \$5 shares, and a new building is to be put up very shortly. The store is to furnish everything usually called for in a family, and though the patrons will pay cash while the works are running, in case of depressed times leading to their temporary stoppage shareholders will be granted credit to the amount of their stock.

There is quite a scarcity of skilled workmen at many of the Pittsburgh iron mills, although there is no lack of unskilled workmen. At the works of the Republic Iron Company, Limited, 4 of the 16 new puddling furnaces recently erected by that firm are at present idle for want of puddlers.

The A. Garrison Foundry Company, of Pittsburgh, were chartered on the 24th ult., with a capital stock of \$65,000.

It is authoritatively stated that the Big Muddy furnace, situated at Grand Tower, Ill., which has been idle for a long period, will be put in operation again in the near future.

The Woodstock Iron Company, Montgomery, Ala., organized last week, with the following board of directors: A. L. Tyler, Samuel Noble, Mayer Lehman, H. S. Eckert, Joseph Goetter, W. S. Turner, William Noble, D. P. Beator, J. F. Flourney; President, A. L. Tyler; General Manager, Samuel Noble; Secretary and Treasurer, F. M. Hight.

The Wisconsin Furnace Company, of Chicago, have been incorporated with a capital of \$35,000. The incorporators are: Messrs. Charles Ford, Stewart M. King and Charles S. Quinlan. They have leased the Fond du Lac Furnace, at Fond du Lac, Wis., and hope to be able to get it into blast by March 1. They have purchased from the owners of the furnace a large quantity of wood which will be at once converted into charcoal, thus enabling the furnace to be put in blast at the early date named. They have also purchased a number of charcoal kilns in addition to those originally belonging to the furnace, and hope thus to secure a sufficient supply of charcoal to keep the furnace in steady operation. Messrs. Forsyth, Hyde & Co., of Chicago, will sell the product.

The Bangor Furnace, at Bangor, Mich., has been leased by the Spring Lake Iron Company, who will take possession on the 1st of June. They will also continue to operate their furnace at Fruitport.

Machinery.

The Union Switch and Signal Company, of Pittsburgh, are now employing about 300 men at their works at Swissvale, and many additional men will be given employment upon the completion of improvements now under way.

The Niles Tool Works in Hamilton, Ohio, recently furnished a steel tire turning lathe to the Cleveland, Columbus, Cincinnati and Indianapolis Railroad shops.

The Westinghouse Air brake Company, of Pittsburgh, have just ordered 50 freight cars from the car shops at Altoona, which they will use for their own private purpose. They will experiment on the cars.

The Wainwright Mfg. Company, of Boston, report that during the month of January they have sold between 1800 and 1900 of their exhaust feed-water heaters.

Gordon & Gilbert, of Philadelphia, Pa., manufacturers of presses, dies, seamers and special and general machinery, have issued the following notice: "Whereas, certain parties are building and advertising for sale machines for seaming sheet-metal can and box bodies, which are a direct infringement of patents owned by us, warning is hereby given to the trade against using such machines, and to all persons against making and offering them for sale, as we shall protect our right against all infringements."

Noble Bros., Anniston, Ala., have ordered for their car-wheel works a new steam drill press, which makes six holes at once. They have also two steam hammers that forge 40 car axles per day.

The Crane Bros. Mfg. Company, Chicago, Ill., elevators, have increased their capital stock from \$1,000,000 to \$1,500,000.

The Bignall & Keeler Mfg. Company, of St. Louis, Mo., refer to the following as among their late sales: Peerless nipple machine to F. S. Martin & Co., Minneapolis; No. 8 new Peerless to P. R. McLeod, Chicago; No. 6 Peerless to the Kupferle Bros. Mfg. Company, for the Anheuser-Busch Brewing Association.

Boys, Porter & Co., of Connellsville, Pa., recently received an order for a carload of machinery castings from the Moulton Mining Company, of Butte City, Mont., and an order from the Youngstown, Coke Company, of Youngstown, Ohio, for a special mine pump with a 12-inch water cylinder, 26-inch steam cylinder and 43-inch stroke. The water end of this pump will be made of

composition acid metal. These orders, in addition to other orders for pumping engines and coke works and furnace supplies, will keep their works busy with increased help for the next 90 days.

The Billings & Spencer Company, of Hartford, Conn., are now making some 6000 pure copper drop forgings per week. They are commutator bars for electric motors, and are made in 11 sizes, coming from the drop ready for use save a slight turning up which is required.

We learn that the Osgood Dredge Company, of Albany, have lately received two orders for heavy dredges—one from Charleston, S. C., for a dredge with two cylinders 12 x 18 for main engine, and two cylinders 7 x 10 for swinging engine. The other is from Boston, Mass., and to have two cylinders 14 x 18 for main engine, and two cylinders 7 x 10 for swinging engine.

The Clark Machine Company, of Turner's Falls, Mass., builders of water wheels, circular saws, fire pumps, &c., have just furnished Wyman Flint & Sons, of Bellows Falls, Vt., with one of their fire pumps. William Russell & Co., of Bellows Falls, have also received from them one of their largest makes of fire pumps.

Messrs. Tyler Bros., of 8 Oliver street, Boston, Mass., have issued a very neat little circular, in which they announce that they are at present erecting works in Boston for manufacturing iron and steel lap-welded boiler tubes and pipes for the special accommodation of the New England States. These works, it is thought, will be completed next month, and will go into operation on about March 1, with a capacity of 100 tons daily of all sizes of tubes from 1 1/4 inches up to 10 inches, and all lengths up to 22 feet. The works will be the only lap-welded boiler tube and pipe works in the New England States.

Hardware.

C. H. Papps has succeeded S. Richardson as proprietor of the Claremont File Works, Claremont, N. H.

The American Steel Scraper Company, Sidney, Ohio, are now occupying their new works, which from their location give advantages for the receiving and shipping of goods. The factory consists of a main building and two L's, the main building being 126 feet in length and the wings 100 feet each. All these are of two stories except the blacksmith shop, which is in one of the wings. The machinery for the manufacturing is alluded to as the most improved.

The Old Colony Rivet Company, Kingston, Mass., have rebuilt their annealing house, recently destroyed by fire, and are now running to their full capacity on their well-known brand of Norway iron rivets.

Timothy B. Hussey, North Berwick, Me., during the past year has added some 50,000 square feet of floor space to his Agricultural Implement factory, thus putting him in position to nearly double his productions for the present year.

The Sidney Steel Scraper Company, Sidney, Ohio, have their new works in good running order, and with their increased capacity are in a position to do an extensive business, which from present indications they are hoping to receive during the present year.

The Bangor Edge Tool Company is reported to be doing a large business in cant dogs and handles. They are said to be turning out 300 long handles per day.

On January 20 the machine shop connected with the factory of the Freeport Hardware Mfg. Company, of Freeport, Ill., was destroyed by fire. The other shops and warehouses were not damaged, and there will be no delay in filling orders promptly. The machinery is running at their Warner shops and their business is not interrupted in the least. A note from the company informs us that the loss has already been adjusted by the payment to them of \$1842 insurance.

The Crescent Horse and Wire Nail Company, of Belleville, Ill., have been incorporated with a capital of \$10,000, by Oliver Roberts, John Stearns and H. R. Challenor.

The Baker Wagon Iron Company, of Beaver Falls, Pa., formerly known as the Pittsburgh Hinge and Chain Works, is now employing about 200 men, and are putting in additional forge fires and machinery.

The Northwestern File Works, of Chicago, have lately increased their capacity, and now have facilities for turning out 700 dozen of files per week.

The Belleville Wire Nail Company, Belleville, Ill., have been incorporated by Messrs. George B. Gray, O. A. Krebs and Wesley L. Pieper, with a capital of \$10,000. They propose to manufacture wire nails exclusively with a new machine invented by Mr. Gray.

Miscellaneous.

Rutherford & Barclay, No. 305 Chestnut street, Philadelphia, manufacturers of Rutherford's metallic paint, inform us that they have about completed the addition to their mill located at Lehigh Gap, which will increase their capacity to 9 tons daily, an increase of 3 tons over their former daily production.

It is reported that a company have been organized at Columbus, Ohio, with a capital stock of \$15,000,000, to construct a pipe line from the natural gas fields about Findlay to Columbus and Cincinnati. The projectors of this enterprise are mainly capitalists of Philadelphia and Pittsburgh. D. D. Robbins, of Washington, Pa., has been made superintendent, and surveyors are at work on the route. A 4-foot main will be laid, and gas will be furnished to intermediate towns which take enough bonds to pay the expense of the branch pipes. The company have control of eight gas wells, with an average daily output of 30,000,000 cubic feet a day.

A company have been formed at McKeesport, Pa., to operate a brass foundry there. The capital stock of the company is \$5000.

BROWNE'S UNIVERSAL FLEXIBLE WEATHER & DUST STRIP. THE BEST. ANY ONE CAN APPLY IT.

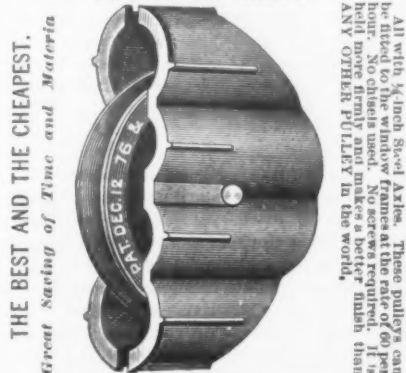
Has been on the market for nine years, is sold by Hardware Dealers all over the United States, and acknowledged to be the best and neatest. Excellent shelf goods. Send for samples and discounts.

COURTENAY & TRULL,

15 Dey St., New York.

The Empire Sash Pulley.

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THE BEST AND THE CHEAPEST.
Great Saving of Time and Material

MANUFACTURED BY
EMPIRE PORTABLE FORGE CO.,
COHOES, N. Y.,
Manufacturers of the largest and best line of
Portable Forges and Hand Blowers
FOR SALE EVERYWHERE.

**Palmer's Common Sense
FRAME PULLEY.**

Saves the User 50 Cts. Per Doz.

Mortising all done with a bit. No chisels or other tools required. By hand—eight to one. By power—twelve to one. The only Frame Pulley the Trade can handle with profit. The only Pulley users will buy after seeing this. Send for Circulars.

MANUFACTURED BY
Palmer Mfg. Co., Troy, N.Y.
Sole Eastern Agents,
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**BARLOW'S
HOOK DOOR SPRING.**



Simplicity of construction will be seen at a glance. Easily applied by any one; does its work perfectly, and is the only spring that can be regulated without a tool. Made of Fine Crucible Steel, and is recommended with entire confidence and warranted.

For prices and full description, address,
W. S. BARLOW, Patentee
PATERSON, N. J.,
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THE PERFECT DOOR SPRING.
Cheap, Simple, Durable, Effective.
FOR LIGHT AND HEAVY DOORS.
Indorsed by the Trade.



Made in four sizes of the best Crucible Steel Wire. The smaller sizes have no equal for screen and other light doors.

COILED WIRE BELTING CO., 93 CHURCH ST., NEW YORK.

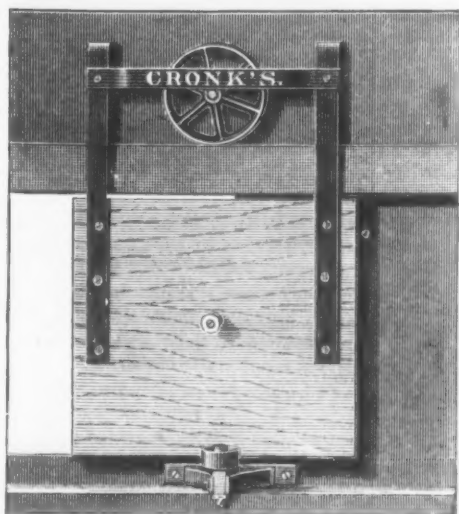
KEITH & TRUFANT
MANUFACTURERS OF
WIRE NAILS
CAMPBELL & WIRE TACKS
MASS. OF EVERY DESCRIPTION.

**The Reiter Improved
"CHAMPION"
Self-Locking
TRANSOM LIFTER**
F. A. REITER,
Manufacture.
11-13 S. Canal St., CHICAGO.

A represents the stationary guiding and locking bar which receives the operating rod C.—It forms with arm E & bracket F the connection with the transom. D is the adjustable guide to hold the guiding & operating rod to the door casing. Handle G in combination with parts A & C forms a novel locking device and will hold the transom in any desired position no matter how the transom may be hinged.

We also manufacture several other devices. Send for catalogue and price list.

WROUGHT IRON. ANTI-FRICTION.



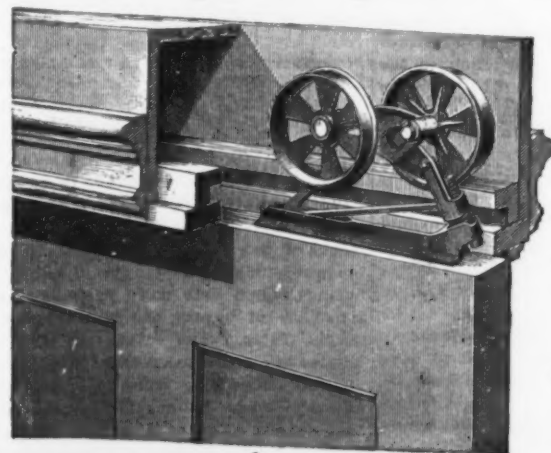
IT EXCELS ALL OTHERS

In security of door.
In ease of motion.
In simplicity of application.

This Hanger and Iron-Clad Track costs less than others that are not as good, and it sells at sight. Requires no oil. Has no flange wheels. Cannot break or get off the track.

Cronk Hanger Co.,
ELMIRA, N. Y.

Barry's Patent Parlor Door Hanger.



The only Hanger made that will not bind on an uneven track.

Send for Circular and Prices to

SYRACUSE BOLT CO.,
Syracuse, N. Y.,

OR
HENRY B. NEWHALL CO.,
105 CHAMBERS STREET,
New York Agents.

LANE'S PATENT STEEL DOOR HANGER.

The most perfect Anti-Friction Hanger in the Market.



BECAUSE
It is made of steel throughout, except the wheel which has a steel axle. It will not break. It is practically free from wear. It is almost noiseless in action. It requires no oil. It has a broad bearing on the door, and keeps in line. It is by far the most durable. It may be used with any track. It is always in order.

LANE'S PATENT TRACK
Is made of steel and is easily put in position. Catches and holds no snow or ice. Door hung thereon cannot jump the track. Is not subject to decay. Requires no fitting, but is ready at once. May be used with hangers of other manufacture.

Manufactured by **LANE BROS., Poughkeepsie, N. Y.**
JOHN H. GRAHAM & CO., General Agents, 113 Chambers Street, NEW YORK.

IRON ROOFING
SIDING, CEILING,
ARCHES AND LATH.
CINCINNATI
CORRUGATING CO.
CINCINNATI, O.
SEND FOR ILLUSTRATED CATALOGUE.

BOOT CALKS.

**FORGED FROM BEST
Crucible Steel
AND TEMPERED IN OIL.**

Ball Calks packed 100 in box, 1000 in package.
Heel Calks " 50 " 500 " "

Samples and Prices sent on Application.

LUFKIN RULE CO., CLEVELAND, OHIO.

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SEND FOR CATALOGUE AND PRICE LIST

W. R. OSTRANDER & CO.,
21 and 23 ANN STREET, NEW YORK.
Manufacturers of
SPEAKING TUBES, WHISTLES, ELBOWS, ORAL ANNUNCIATORS, BELL & ELECTRIC WIRE TUBING.

Complete Outfits of Speaking Tubes, Whistles, Pneumatic Bells, &c. A full size of Speaking Tube hardware constantly on hand. Catalogues on application. Factory, DeKaube, near Knickerbocker, Brooklyn, L. I.

SCIENTIFIC AND TECHNICAL.

The Employment of Salt for the Removal of Snow.

The current volume of the "Minutes of Proceedings of the British Institution of Civil Engineers" contains an abstract of a memoir on this subject by M. Barabant, which appeared in a recent number of the *Annales des Ponts et Chaussées*. It appears that in 1880 M. d'Ussel gave a description of his first attempts to thaw the thin layer of ice in the public streets, produced by the compression of snow by vehicles in time of frost. Since that period, owing to the expenditure of nearly \$1,000,000 in futile attempts to remove the snow in Paris in 1879-80 and 1880-81, the heavy tax has been removed from pounded salt, not suitable for ordinary purposes, enabling salt to be largely used for clearing away snow, a provision of 4000 tons of salt having been made for this purpose in Paris for the winter of 1885-6. A regular service for the removal of snow on its first appearance has been organized in Paris, as it is important to clear away the snow before it has been compressed into ice by the passage of vehicles, when it is far more difficult to remove. As falls of snow rarely occur at Paris with a temperature much below the freezing point, salt may be sprinkled on the snow, producing a liquid, of which the temperature may descend to 5° F. without its freezing. The salt should be scattered on the streets as soon as the snow begins to fall fast; the mixture is effected more thoroughly by the traffic, it does not adhere to the ground, and gradually liquefies, so that at the end of four or five hours the streets may be cleared by the sweeping machine, the caoutchouc rake passed over the footpaths, and the mixture washed to the sewers by the addition of water. This cold mixture does no harm to paved roads, asphalt and wood pavements; but salt should not be used on macadamized roads, which are disintegrated by the frequent artificial thaws thereby occasioned. This affords another reason for discontinuing macadamized roads in large towns, in France, which possess the great disadvantages of being very muddy in rainy weather, or during thaws, and of discharging quantities of sand into the sewers.

The employment of salt would probably be very restricted in countries where the temperature often falls below 5°, but everywhere else it furnishes the best means of dealing with snow. It has been suggested that the coldness of the mixture is disagreeable to foot passengers, destructive to boots, and bad for horses' feet; but the latter can be protected by greasing the inside of the hoof, and as the mixture should be removed directly it becomes liquid the inconvenience both to men and animals is very short in duration and very slight compared with the advantages and economy of the system. The salt should be scattered in the proportion of about 1 dram per square foot for each $\frac{1}{2}$ inch of thickness of snow fallen, or a larger amount if the temperature is low. Formerly each centimeter—0.4 inch—depth of snow falling in Paris necessitated an expenditure of over \$12,000; whereas now the cost is only about \$4000, or a saving of two-thirds. Moreover the use of salt dispenses with sanding the streets, which, on the arrival of a thaw, produced quantities of mud in the streets and deposit in the sewers. Further, if the cessation of interruptions of traffic by means of this process is taken into account the indirect gain to the people of Paris must be reckoned by millions of francs. Several machines have been devised for the removal of snow, but none of them are as cheap as salt, and the author gives a comparative estimate of the cost of melting snow by steam and by salt, which shows that the method of steam would be much more expensive besides entailing other disadvantages. The use of salt will probably not be confined to the clearing of the streets in towns, but be extended to all paved roads, to tramways and to the approaches to railway stations and all large manufactories. Perhaps, even in France at any rate, salt might be used for dealing with snowdrifts in railway cuttings, by spreading it in sufficient quantities and sweeping thin layers successively salted. On all paved roads over which there is considerable traffic the use of only half the proportion of salt adopted in Paris would enable a track of 6½ feet to 10 feet in width to be dealt with, along which the snow would be prevented from being frozen to the ground, and thus rendering traffic almost impracticable. The small cost of the system and the advantages to traffic are sufficient reasons for an early and wide extension of the use of salt for removing snow.

Spiral Springs for Measuring Instruments.

The causes likely to effect the constancy of spiral springs are given in the *Electrotechnische Zeitschrift* by Mr. W. Kohlrausch, with an account of experiments bearing on each point, in order to afford some idea of the reliance that can be placed on the indications of instruments into the construction of which they enter. From an abstract which is given of the paper in the excerpt minutes of the proceedings of the British Institution of Civil Engineers we take the following: The effect of age, judging by observations on a brass spring extending over a period of seven years, may be completely neglected. Continuous and prolonged distortion produces a small amount of permanent set, so that the spring when released does not return to the original position, but does not actually alter the indications of the instrument if the readings are taken from the new zero thus found; steel is in this case less affected than German silver. Oft-repeated, but intermittent deformation—as exhibited by a spring of 90 convolutions and 2½ inches long being stretched so as to change from a length of 3½ inches to 9 inches, 200 times per minute for 400 minutes—introduced no appreciable alteration in its subsequent indications. An increase of temperature of 18° F. raised the indications of a Siemens' torsion-galvanometer about $\frac{1}{2}$ per cent.; so that the reduction in the elasticity of the spring is apparently almost equal to the decrease in the moment of the magnet, which would be, under these conditions, about 0.4 per

cent. Further experiments on loaded springs confirmed this conclusion and showed that steel was again to be preferred to German silver. By combining the results given above, the utmost limit of error introduced by the use of spiral springs cannot exceed 0.5 per cent. If, however, as is the case in the Siemens' tension galvanometer, the current passes through the spiral spring, care must be taken that the heating from the passage of the current is not excessive. Mr. Kohlrausch found an alteration of 1.4 per cent. in the indication of such an instrument after 30 minutes continuous test, with a difference of potential of 100 volts between the terminals. If such instruments be calibrated at intervals to correct the decrease in the moment of the magnet, an accuracy within about 0.1 per cent. can be relied on. With the Siemens dynamometer for intense currents, the limit of error, owing to the friction at the mercury contacts, is about 1 per cent. Another form of instrument, the spring-galvanometer of F. Kohlrausch, is also reliable within 1 per cent. Owing, however, to the employment of an iron core, the readings of currents taken in ascending and descending order of magnitudes will vary to some considerable percentage from the effect of residual magnetism, which exists in even the best soft iron, if this error be not eliminated by mechanically bringing the core past the position it would take up under the action of the current, and then leaving it free to return to that position.

Durability of Timber Under Strain.

Writing on the subject of durability of timber under strain, the *American Architect* of recent date says: "If we carefully estimate the force required to tear a piece of wood asunder, we find that lengthwise of the grain requires the greatest force. If we subject it to the pressure across the grain, for every degree we bend it we find this resistance increased 11.617 per cent. (an average of 13 varieties of wood tested) increasing in direct ratio until sufficiently bent to displace its molecules, when, of course, its strength decreases rapidly. Timbers, then, subjected to a certain tension in the building will outlast those not subjected to it. Again, a timber bearing a certain number of tons of weight for a certain length of time, will bear a much heavier weight without being unsafe than if the timber having lain idle should afterward be loaded. This increase of strength may be proved by the following experiment: Three pieces of some brittle wood, carefully made of equal size, are placed side by side, with one end resting on some firm base; on one is placed 100 grams, and on another 500 grams, and they are then left for a week or more in a warm, dry situation. The one bearing the greatest weight will have bent the most, and will bear more weight than the more lightly loaded piece, while the same weight placed on number three will break it. This proves conclusively that a certain weight placed on a timber renders it capable of bearing one still greater subsequently. A timber with all it will bear without displacement will actually bear more additional weight subsequently, and keep on increasing in both its wrenching and tensile strength than if it is laden one half as heavily at the outset. Viewed with a microscope, we find that the instant the wood is bent out of the true the fibers become closer at the bend or angle. Now, if the pressure is continued just far enough to bring these in actual contact without force sufficient to mar or bruise them, they adapt themselves to the situation, and are absolutely glued together by the gummy substances liberated by the cells ruptured in the bending. Furthermore, timbers subjected to pressure will decay less rapidly than when not. A stick of lancewood bent double, and the ends made secure, and the same exposed to the influences of decomposition will show the effects much sooner in those portions not bent than where the sharp angle appears: moreover, a stick actually broken in bending will not rot so soon at the break as at some distance from it, and fungous growths rarely appear at the point of bending as soon as elsewhere. At first sight it would appear that, subjected to constant pressure, wood would undergo the same change as iron, but experiment has demonstrated the contrary. In some of the ancient ruins of Europe those portions which apparently sustain the greatest pressure, such as roof trusses, gables, &c., are in a much better state of preservation than the joists which were merely supports for nailing, &c.

Analyses of Shot.

H. Hardaway has made some analyses of shot, the results of which he has published in the *American Chemical Journal*. From the brands in our market the following were selected, all being clean, well-shaped bird shot: No. 1.—Wythe Lead and Zinc Mine Company, Virginia; No. 2.—Merchants' Shot Tower, Baltimore; No. 3.—Leroy Shot and Lead Mfg. Company, New York; No. 4.—Tatham Bros., New York. A complete analysis of each of these was made, employing for each over 100 grams, from which the lead was separated as sulphate, but estimated by difference, affording the following results:

	No. 1.	No. 2.	No. 3.	No. 4.
Arsenic.....	0.0824	0.0293	0.2725	0.1413
Iron.....	0.0666	0.0167	0.0399	0.0121
Copper.....	0.0752	Trace	0.0281	0.0157
Silicon.....	0.0441	0.0263	0.0092	0.0222
Carbon.....	0.0115	0.0269	0.0041	0.0055
Lead.....	99.7963	99.9121	99.7062	99.8281

We find in Muspratt's *Chemistry* as to the amount of arsenic present: "The limits are from 3 to 5 or 10 parts in 1000, the lesser quantity being employed, as the lead is more ductile and the larger when it is hard." In this selection of American shot it is seen that the amount is much smaller and the range yet wider, being from 0.04 to 3.0 parts in 1000. It does not appear from these results that there is any special connection between the amount of arsenic and copper and iron, yet it is to be noted that the amount of arsenic increases as that of silicon diminishes. That any silicon at all should have been detected in shot by Mr. Hardaway will be a matter of much surprise to manufacturers.

The Iron Age

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The Consumption of Pig Iron in 1886.

Mr. James M. Swank, secretary of the American Iron and Steel Association, has just issued his complete official statistics of the production of pig iron, the aggregate of which shows our earlier estimate to have been within 2000 tons of the correct total—a fact to which we allude only because it is calculated to inspire the trade with confidence in our monthly estimates of output, based on fairly complete returns. What make Mr. Swank's statistics particularly interesting are his statements of stocks on hand unsold, giving an opportunity to arrive at a close estimate of the apparent home consumption. Unfortunately we do not possess the official figures of the imports for the month of December, but we probably do not err much when we assume that the total imports of pig iron for the year 1886 were 375,000 gross tons, since the total for the first 11 months was 340,448 gross tons. Taking this as the basis, we have the following figures for the four half years:

Years.	Gross tons.	Years.	Gross tons.
First half, 1885.....	1,920,374	1881.....	1,895,940
Second half, 1885.....	2,124,154	1882.....	4,903,278
First half, 1886.....	2,637,687	1883.....	4,834,740
Second half, 1886.....	3,046,856	1884.....	4,229,280
		1885.....	4,348,844
		1886.....	6,308,636
		1887.....	8,990,405

Probable Home Consumption.

Years.	Gross tons.	Years.	Gross tons.
1874.....	2,500,000	1881.....	4,982,565
1875.....	2,000,000	1882.....	4,903,278
1876.....	1,900,000	1883.....	4,834,740
1877.....	2,100,000	1884.....	4,229,280
1878.....	2,500,000	1885.....	4,348,844
1879.....	3,432,534	1886.....	6,308,636
1880.....	8,990,405		

Nothing could more strikingly illustrate the progress in the iron trade of this country than the fact that we should have converted 6,208,656 gross tons of pig iron into finished products without importing more than 375,000 tons of foreign pig, when in 1881 we bought 465,031 tons abroad and in 1882 540,150 tons. We are now producing at the rate of 6,250,000 gross tons, annually, and long before the year is over will be making at the rate of 6,500,000 tons, providing no disturbing causes interfere with regular work. Our own plants could therefore take care of more than last year's consumption. We must have a certain amount of spiegel-eisen and Bessemer and foundry iron, and have already ordered some foreign pig, so that the total supply for the year will not fall short of 6,750,000 gross tons. How much more will the demand call for? That is the all-absorbing question. Every indication points to an increase beyond the figure named. In the face of the enormous consumption during the past six months, it is somewhat difficult to escape the conclusion that we shall have to import more liberally.

It may be of interest to state in this connection that our home consumption was greater than that of Great Britain. That is to say, we worked into finished forms more pig iron in 1886 than England, with its enormous export trade in finished goods. Deducting from the supply of that country the quantity of pig iron exported as such, we reach a total of 5,405,743 gross tons as the entire amount converted in Great Britain into castings, manufactured iron and steel in 1886, both for use in England and to supply the material for the finished goods exported to all quarters of the globe. Our own apparent home consumption was 6,208,656 gross tons, or, roughly, 800,000 tons greater. That is a record of which Americans may well be proud.

Contracts in Restraint of Trade.

A contract in restraint of trade is the legal designation of agreements whereby one person agrees for some consideration not to carry on his trade or business or practice his profession. Sometimes these agreements are so worded as to express a broad promise never to carry on the business at any time or in any place, but generally they are limited to a promise not to do so for a certain time or in a particular locality. In times of great competition such contracts have become very common, and the temptation to enter into these arrangements is very strong. A newcomer in a country town, for instance, buys the stock in trade and the good-will of a hardware business. There is nothing to prevent the seller from opening a new store and carrying on the same business in the same place, and he would of course be likely to retain his old custom and thus greatly injure, if not destroy, the business of his competitor. To protect himself nothing would be more natural than for the latter at the time of purchasing the business to bind the seller by a contract not to carry on the same business. If such a contract is legally good and enforceable, the new man would have the right to compel the other to keep his promise, and in case the latter should break it, could either close the business by injunction or sue him for damages. The question therefore is, are such contracts valid in law? It is an important and interesting question, for these agreements are by no means uncommon, and many of them have been the subject of litigation in the courts. The general rule is that contracts in restraint of trade are void *prima facie*, but under some circumstances they will be sustained. A distinction is taken between contracts in general restraint of trade and those in partial restraint of trade. The former are always void and the latter are usually good. By general restraint is meant a broad promise never to carry on the business at any time, or a promise not to carry it on in any place. But a promise not to carry on the business in a particular place or locality is valid, as a contract not to engage in the milling business within 30 miles of a certain town. The contract may restrict the promisor from carrying on the business within a county or a larger territory, but it is questionable whether a contract embracing a whole State would be good; it is certain that a contract covering the whole country would be invalid.

In an interesting English case the facts were that the defendant had entered the employ of the plaintiff, a druggist, carrying on business in the town of Taunton, under a written contract that he would not at any time after leaving the plaintiff's service engage directly or indirectly in the business as a chemist or druggist within the town of Taunton. After leaving the employ of the plaintiff he broke his contract. The Court of King's Bench held the contract void on account of indefiniteness. It was deemed unjust, as it did not limit the restriction to such time as the plaintiff might continue to carry on business in Taunton, nor even to the life of the plaintiff. The restraint was held to be larger than the necessary protection of the party in whose favor it was given, and therefore was void. On appeal, however, this decision was reversed, and it was held that the good-will of the plaintiff's business was property which continued to have value after the plaintiff's death, and that he therefore might legally contract for protection for any period of time. The question of time, therefore, as entering into

the validity of these contracts does not seem to affect them. It is the question of locality or territory which must above all things be considered. This is the law in the United States, as well as in England. The ground on which the courts hold any contracts in restraint of trade invalid is that public interests demand that there should be no restraint upon industry. Competition is desirable and should be encouraged by the law, while monopoly should be discouraged. The United States Supreme Court states two principal grounds—first, the injury to the public of being deprived of the restricted party's industry, and, second, the injury to the party himself by being precluded from pursuing his occupation, and thus being prevented from supporting himself and his family. In the case of a merely partial restraint, of course, these objections do not apply, because the party restrained can go elsewhere and pursue his trade or carry on his business, thus benefiting the public and himself. In making contracts of this nature, great care should be taken to make the restriction limited or partial, and not general, for if the contract is void it is entirely void, and no part of it can be enforced.

A new principle has just been applied to this subject in the case of Mandeville against Harman, decided last December in the Court of Chancery of New Jersey. It is there held that a contract in restraint of trade is invalid, whether it is general or partial, unless it is reasonable. Of course every contract to be valid must be founded on a sufficient consideration, but even this will not be enough in these contracts unless the contract is reasonable. This was the case of a physician in the city of Newark, who employed an assistant under a contract not to "engage in the practice of medicine in the city of Newark at any time hereafter." The assistant left his employment and opened an office for himself. The plaintiff sought to restrain him by injunction. The restriction in the contract bound the defendant by its terms never to practice medicine at any time in Newark. This was decided to be unreasonable, as all that the employing physician could reasonably ask was that his assistant should not practice medicine during the former's lifetime. After his death he could have no possible interest in preventing the other party from engaging in such practice. There is nothing similar to good will, as in the case of a mercantile business, as the confidence reposed in a physician is purely personal. If he had been content to have contracted that the defendant should not engage in practice in Newark during the life time of the plaintiff, this restriction would probably have been valid. In the light of this important case it will hereafter be necessary to consider in every case of a contract, even in partial restraint of trade, whether the restriction is reasonable or not.

The English Iron Trade in 1886.

The long-looked for reaction from the sustained bull movement, which had its principal source at Glasgow, has at last come. Prices which had averaged in May, 1886, as low as 38/4 for Scotch warrants, rose steadily after that, reaching 39/9 in September, 41/11 in October, 42/11 in November, and 43/3 in December, closing the year at 44/6. They went above 45/ on the 8th and jumped to 47/7 on the 12th, a rise of 75 cents in 12 days. On the 21st, however, they had gone back to 46/7, and on the 28th were only 45/5. No. 3 Middlesboro' iron, which started in the year with 33/ went up to 38/ by the middle of the month, from which it has receded to 36/6 at its close. This reaction, while it is not great enough to lead to very heavy sales in this country, is, however, a forcible reminder of the fact that we cannot expect the foreign markets to keep ahead of our own. From all accounts which reach us from the other side, the principal claim of speculators on the bull side has been that Americans, unable to supply their own requirements, must purchase liberally from them, and visions of the days of the boom have been conjured up to sustain this line of argument. The matter may be stated briefly thus: If the English ironmakers hope to put up prices and hold them there merely on the strength of the demand for this side they will be disappointed. If the consumption from other quarters increases simultaneously, then higher prices are possible and probable. The buying from all quarters which always accompanies a rising market cannot be expected to last long, and is generally followed by a period of dullness and a declining tendency. There can be no doubt that this last element has been quite a powerful factor in the English iron trade lately, but it appears now to be exercising a less potent influence. Thus far every indication points to the fact that our purchases alone have buoyed up the trade abroad. The statistics for the exports from Great Britain during the year 1886 show this clearly. Taking the leading lines, we have the following:

Pig Iron.	1885.	1886.	Increase or decrease per cent.
Total exports.....	960,581	1,044,237	+ 8.6
To United States.....	113,409	287,030	
Other countries.....	847,172	757,207	
Decrease.....		- 80,965	
Bar, Angle, Bolt and Rod.	1885.	1886.	Increase or decrease per cent.
Total exports.....	264,472	243,346	- 7.9
To United States.....	2,159	2,196	
Other countries.....	262,313	241,150	
Decrease.....		- 21,163	

Railroad Iron.	1885.	1886.	Increase or decrease per cent.
Total exports.....	714,276	739,831	+ 3.5
To United States.....	5,775	89,250	
Other countries.....	708,499	650,581	
Decrease.....		- 57,918	
Wire.....	55,088	40,174	- 27.0

Hoops, Sheets and Plates.	1885.	1886.	Increase or decrease per cent.
Total exports.....	330,954	307,135	- 7.2
To United States.....	21,871	17,221	
Other countries.....	309,083	290,914	
Decrease.....		- 18,169	

Cast and Wrought Iron.	1885.	1886.	Increase or decrease per cent.
Total exports.....	347,063	335,879	+ 2.2
To United States.....	1,469	2,189	
Other countries.....	345,594	333,690	
Increase.....		+ 7,296	

Old Iron.	1885.	1886.	Increase or decrease per cent.
Total exports.....	85,233	144,838	+ 69.9
To United States.....	14,308	65,141	
Other countries.....	70,925	79,697	
Increase.....		+ 8,849	

Steel, Unwrought.	1885.	1886.	Increase or decrease per cent.
Total exports.....	60,481	165,838	+ 174.1
To United States.....	14,644	105,680	
Other countries.....	45,837	60,158	
Increase.....		+ 14,321	

Tin Plates.	1885.	1886.	Increase or decrease per cent.
Total exports.....	298,398	334,775	+ 12.2
To United States.....	233,829	233,585	
Other countries.....	74,569	71,190	
Decrease.....		- 3,379	

It will be observed that, when the quantities sent to this country are eliminated, the balance is far from being so flattering, as an indication of the business done with other customers by the English iron and steel masters. When this is coupled with the indications we possess concerning the home demand, the situation is by no means calculated to indorse the high hopes of those on the other side who are rushing up prices, and the few in this country who believe that we can go ahead indefinitely, without paying any attention to doings in Europe. Let pig iron be taken as a striking example, and as reflecting the movement in all other goods. The figures stand as follows:

	1885.	1886.
Production.....	7,332,657	6,750,000
Increase in stocks.....	542,702	300,000
	6,789,955	6,450,000
Exports.....	960,581	1,044,237
Apparent home consumption.	5,749,374	5,405,763

As against the one solitary fact that we have bought 175,000 tons of pig iron more in 1886 than in 1885, stands an increase in stocks of 300,000 tons, and a falling off in home consumption of 350,000 in spite of our taking 55,000 tons more of rails, 90,000 tons more of blooms, and 40,000 tons more of tin plates. The extra purchases just alluded to amount to a consumption of about 225,000 tons of pig iron by English steel and iron works, helping the furnace-men to that extent. This is a fact which must be taken into consideration to appreciate what a heavy increase in the demand must come to English works from other quarters to check the piling up of stocks and lead to a lessening of the 2,550,000 tons on hand. But prices are now at a point considerably above the average of 1884, when the output was 7,528,966 gross tons when the piling up of heavy stocks began. We may expect a considerable increase in the output this year, as there is much reserve capacity, which the recent advance will surely bring out. This is likely to be a steady element in the future.

To the American trade the figures we have presented are of much significance. They show that if for one cause or another the demand in England from other countries does not materially improve, and the home consumption then does not develop quite rapidly, a decline may be precipitated which will cause a good deal of iron to be pushed into this market. We know that this fear is now uppermost in the minds of producers, but we question whether the majority fully understand that prices abroad can only be kept above the parity of our own in the long run by buying from all quarters of the globe. The speculative element in England has operated in anticipation of its coming. It remains to be seen whether this is to be realized. It is to this point now that the attention of all on both sides of the Atlantic should be directed. The international iron trade follows rather than it leads improvement in business. As the circular of a leading English firm puts it: "The iron trade must wait until the world has regained increased purchasing power as a result of a solid improvement in the produce market." It is certain that thus far this first condition is not generally fulfilled. It is true that wool, coffee and some other staples have advanced considerably, but others more important are still dragging, and the political situation the world over is not yet clear enough to afford much encouragement.

The increasing tendency of working to standards, and the gratifying extent to which uniformity in machine design has been carried in this country are worthy of note. To English engineers, American practice in this respect is one of novelty, in a comparative sense and interest, and one which, except in a general way, has among them received little attention. It is evident that, under the circumstances, American machinery may be studied by them with some profit, practically demonstrating the benefits of a system which, in theory, have long since become recognized. In railway work of nearly all kinds the advantages of a uniform system of construction are especially apparent, and in this perhaps more than in any other branch, have they accordingly been embodied in current methods. The good results which have been arrived at in consequence, are well known and striking

in character. More recently the matter has been given renewed attention abroad, and there appears to be some promise of substantial development.

A New Mining Craze.

A mining craze is raging with fury in Wisconsin. Scarcely a day passes now which does not witness the birth of from two to a half-a-dozen companies in the office of the Secretary of State at Madison. These companies are almost invariably incorporated to mine iron ore, and their capital usually ranges from \$1,000,000 to \$2,000,000, two of them even reaching \$5,000,000. The average capital of the companies incorporated in 1886 was about \$1,300,000. The rapidity with which this craze has developed is shown by the fact that in 1885 only three mining companies were formed in Milwaukee, with a total capital of only \$1,025,000, while during 1886 and the first three weeks of 1887 there were 50 companies incorporated in that city alone, with an aggregate capital of \$67,313,000. In the latter period there were also 36 companies registered in Wisconsin, outside of Milwaukee, with an aggregate capital of \$38,325,000. In the entire State in this short time there were consequently 86 mining companies formed, with a total capital of \$105,643,000. And the fever shows no signs of abatement.

The excitement has been caused by the good fortune which attended those who were interested in the early development of the now great Gogebie range. An investment of a very moderate amount of money by these individuals brought fabulous returns. It is safe to say that recent investors will be satisfied with a greatly diminished profit on their operations, but there is little danger either in predicting that not one in ten of them will be the richer by his venture in this new field of speculation. Mines have been bought during the past few weeks for \$25,000 to \$100,000 which have since been capitalized at \$1,000,000, which sufficiently illustrates the absurdity of the high nominal capital. The days have passed when any purchaser expects a fair return on such an immense capitalization, the only possible use it may have being to make the discount seductively great. The parties who sold out to the "boomers" would certainly have held on to their property in almost every case if it had been so immensely valuable. There is danger that outside parties may be induced to invest in the stock of their inflated properties if they are not warned against the perpetration of such folly. The majority of the shares are probably dear at 5 cents on the dollar. We would say to would-be investors that no money should be put into these mushroom mines, except after thorough investigation. A small number of these properties will bear such investigation, and the companies controlling them are offered by men of probity and of experience in iron-ore mining. Stock in such companies may prove highly valuable as long as the demand for iron ore is as great as it is at present. But when the inevitable depression in the iron trade comes, even such companies will feel the pressure of hard times and may not pay dividends. As to the others, they will be "wiped out" as with a sponge, and their deluded stockholders will be left with lithographed certificates of no more value than waste paper.

Western business men complain with good reason of the difficulty they experience in shipping to Southern points. Neither express companies nor railroad companies will make rates from Chicago to points further South than Memphis. Certain classes of goods are sold at a rate delivered to the buyer, and sellers consequently find it very difficult to adjust prices to meet this state of affairs in the South. It has in many cases been found necessary to send small articles by mail, put up in several packages to make them mailable, when it would have been much more convenient to send them by express if through rates could have been obtained. This is not a new restriction on trade, but is of long standing, and express companies and freight lines seem equally blind to the demands of their patrons. Although goods would frequently have to be sent over several lines in order to reach distant points, there certainly can be no insuperable difficulties to the establishment of a through rate to be divided among the several lines according to the distance over which each may carry the goods. The express companies particularly are directly interested in the establishment of a different policy from that now prevailing.

Secretary Whitney's course in advocating the adoption of triple expansion engines on new vessels for the navy has much to commend it, and we have little doubt that his plans, if carried into effect, will give general satisfaction. Experience abroad during the past few years has furnished conclusive evidence of the superiority of this type of engine, as compared with the ordinary compound, and, though its introduction has extended to a most noteworthy degree, we have yet to hear of a single instance where it failed to establish a flattering record. In the matter of coal economy, which is more than ordinarily important on board ship, triple expansion engines have, in fact, given remarkable results, and the confidence of obtaining good work which they inspire is well merited. While, there-

fore, the cost of construction is somewhat greater than in the case of other accepted forms of marine engines, the returns in the shape of saving of coal and of space otherwise given up to coal supplies, or of capacity for long trips without the necessity of replenishing bunkers, afford more than counterbalancing advantages. Whether appropriations to cover the consequently increased cost of future additions to the navy will be forthcoming, is, of course, a matter of speculation, though it is not improbable that the wisdom of Secretary Whitney's recommendations will be generally appreciated. We need scarcely add that they should be acted upon with the least possible delay. Gunboat No. 1, for which Cramp & Son have secured the contract, will have triple expansion engines of the builders' design, instead of compound engines as at first contemplated, the whole having come within the stipulated limit of cost. Cruiser No. 1, on which all bids were rejected, because the lowest was in excess of the amount appropriated for its construction, was also originally designed for compound engines. Now, however, we understand new plans are to be prepared, and the probabilities are, that in this vessel, too, the more recently developed type of engine will be used.

Mr. A. B. Pullman has expressed himself very strongly in the *Chicago Times* on the subject of car heating. While we cannot follow in detail all that he has said on the proposed method of heating by steam, and to which in substance we may remark space has already been given in various newspapers during the past few weeks, it is of interest to note that he considers heating by steam from a locomotive altogether out of question, and that in his opinion there is but one way to heat a train properly and that is by putting a stove in each car. He proposes accordingly that besides being strongly built each stove should be placed in a compartment by itself. This compartment should be well braced with wrought iron, so as to be capable of resisting severe shock, and might be made detachable also, so that in the event of a collision, derailment, or other accident which would produce a shock of sufficient force to break a stove, the entire compartment, stove and all, would break and fall away from a car. Both compartment and stove should, moreover, be kept securely locked. It is almost unnecessary for us to add that, from what we have seen of the reported interview with Mr. Pullman, steam heating generally for cars, and not only one or two modifications of the plan, to which he makes reference, does not seem to find much favor with him. While his suggestions as to the use of stoves and their disposition are worthy of thought, his objections to what now is undoubtedly the more favored plan, such as danger of scalding in case of breakage of pipes and absence of heat from cars when they are cut off from an engine, are not entitled to that serious consideration which he attempts to give them. We fully agree with him when he pronounces as very inconvenient a heater placed under a car where it would be inaccessible except when the train stopped. For modifications of steam systems, however, which would give good results in point of satisfaction and greater safety to passengers, and also as regards ease of operation, we most assuredly have not very far to seek. They have been proposed at different times and are undoubtedly practicable, though their maintenance might entail a somewhat greater expense than the present stove system.

Connellsville coke was advanced from \$1.50 to \$2 on the 1st of this month, thus unfortunately adding another strong motive for further raising the price of pig iron, and with it of manufactured goods of all kinds in the principal producing section of the country. So heavy an advance was unfortunate, to put it mildly, when every effort is being made by the greater part of the manufacturers throughout the land to keep prices within bounds and prevent heavy imports. We cannot but consider this step as unwise from many points of view. It means a loss of business and of profit to the coke makers by encouraging the import of iron, and it will stimulate the opening up of new territory and the building of new plants whose competition must in the end be ruinous. The iron trade expected and would have been content to pay an advance to \$1.75, but this effort to crowd up values so fast must ultimately prove disastrous to those who attempt it.

The activity in developing iron ore properties in the Lake Superior region is forcibly indicated by the incorporation in Wisconsin on the 25th of January of the following companies: Capital Iron Syndicate, of Madison; capital, \$2,500,000; incorporators, Philip L. Spooner, Jr., F. W. Oakley, Daniel Campbell and W. S. Main. The Vermilion Iron Mining Company, of Milwaukee; capital, \$2,000,000; incorporators, Henry C. Hopkins and James M. Fox, of Milwaukee, and George A. West, of Racine. The Clingstone Iron Mining Company, capital, \$2,000,000; the incorporators are the same as those in the Vermilion Company. The Peninsular Iron Mining Company, of Rice Lake; capital, \$1,000,000; incorporators, D. M. Monteith and S. Manheim, of Rice Lake, and F. W. Hartman, of Milwaukee. It may be remarked that the capitalization of these companies at such high figures indicates an extravagant idea of the profits to be realized.

Sir Joseph Whitworth.

Sir Joseph Whitworth, one of the most distinguished and widely-known mechanical engineers of our times, died at Mentone on the 22d ult., aged 84. He embarked at an early age in the business of machine tool making in Manchester, England, and was soon distinguished for his efforts to obtain the utmost possible accuracy. One of his first steps in this direction was the introduction in 1840 of surface plates instead of grinding for the production of true plane surfaces. The practice of making three surface plates at a time, each scraped so as to touch the two other plates at all points, originated with Sir Joseph Whitworth, and is still recognized as the only method by which an accurately true flat surface can be produced. He became largely engaged in the manufacture of the highest class of machine tools, and devoted great attention to making accurate lead-screws for lathes, &c., and the consequent construction of accurately divided scales and measuring instruments. He exhibited at the first international exhibition, held in London in 1851, a machine capable of measuring within one-millionth of an inch a bar not exceeding 40 inches in length. This machine excited considerable attention at the time, and its construction is based on the principle that for this purpose the sense of touch is much more reliable than the sense of sight, and that minute distances can be enlarged with greater accuracy by mechanical than by optical means. The correctness of this principle has been denied by recent investigators in this country.

Sir Joseph Whitworth was the first to inaugurate a system of standard screw threads. The form of thread, and the number of threads per inch which he recommended, were based partly on the results of numerous experiments and partly on the average obtained by comparing the various forms of screwed bolts then in use. The Whitworth system has been very generally adopted in all parts of the civilized world except the United States. The Sellers system, introduced here in 1864, has the same number of threads per inch, but the form of the thread is different. In 1855 Sir Joseph, then Mr. Whitworth, turned his attention to improvements in guns and rifles and patented his well known hexagonal bore, and showed by a series of careful experiments that rifled shot should bear a certain proportion of length to diameter in order to secure accurate shooting. These guns, though never adopted by the British Government, have been much used in South America and elsewhere. In 1868 he founded the Whitworth scholarships, which were designed to assist young men who were studying to become competent mechanical engineers. This endowment has hardly realized expectations, but has undoubtedly brought to the front many talented young men, both from the college and the workshop.

In 1873 Sir Joseph Whitworth, after several years' experiments, perfected his system of casting steel under compression. He thus succeeded in producing the strongest known material, "Whitworth steel," which is extensively used for marine engine crank-shafts, screw propellers, and other parts exposed to severe strains, where it is desired to obtain the greatest possible strength with the least possible weight without regard to cost. The demand for Whitworth steel was so great that, in 1875, he left his old works in the center of Manchester and moved to the outskirts, where he erected very extensive shops, equipped with the most improved forms of accurate machine tools, hydraulic cranes, forging machines, &c. About 1872 he turned his business over to a limited liability company, in which he retained a controlling interest, the remaining shares being held by his foremen and workmen. This application of the co-operative principle proved very successful, and his workmen attached considerable value both to their shares and to the voice which they had in the management of the works. Sir Joseph distinguished himself in nearly everything which he undertook, but his name will be chiefly remembered in connection with the three great achievements of his life—the introduction of the surface plate, the Whitworth system of screw threads and Whitworth compressed steel. The machine tools which bear his name will be found in every good machine shop, and are distinguished for the accuracy of their workmanship and the neatness of their design. His taps and dies are possibly even more widely known, and are distinguished both for their excellent temper and neat and accurate finish. Sir Joseph Whitworth leaves no son, and, indeed, we believe no near relative. His life consequently expires with him.

During the period of 1875-85 there were no less than 8,555,000 tons added to the registers of the seven countries that are the chief maritime powers in Europe, while 4,537,000 tons were removed from the same registers in consequence of wreck and

2,586,000 tons from other causes. The removals have thus been within 1,500,000 tons of the additions over the period; or, put in another way less than 20 per cent. of the gross additions to the registers are net. It would also appear that to meet the removals from these registers by wrecks and otherwise an average addition of over 700,000 tons of new shipping is annually called for by these seven countries alone, and since the tonnage constructed in the United Kingdom during the years 1884-85 has not exceeded 500,000 tons per annum, there is not much appearance here of overbuilding. It must be remembered also that Great Britain is the only shipbuilding country in Europe of any note. The tonnage annually built in France does not exceed 50,000 tons, Germany has in some recent years gone up to about 80,000 tons, and Italy furnishes annually from 20,000 to 30,000 tons; but all these four nations put together have failed within the last three years to furnish a supply of new tonnage equal to the tonnage lost from various causes. This, says the *London Times*, is a decidedly hopeful feature of the shipbuilding industry, and augurs well for its prosperity in the near future.

The Recent Advance in Metals.

To the Editor of *The Iron Age*.—DEAR SIR: After a long period of prostration in the metal business of our country, particularly so in regard to iron and steel, consumers seem in every quarter to come in for new and big supplies. Looking at it from the standpoint which I take, it seems anything but desirable for the future good of the great metal interest. It is a fact that the cost of manufacturing pig iron, bar iron and steel in all their forms is greater by fully 20 per cent. than the

York and Chicago, call the attention of the trade to their patent cold die-rolled steel, which they are now turning out for shafts, piston-rods, pump rods, guides, &c. They are prepared to furnish it of almost any section desired, accurately rolled to United States standard gauge, brightly polished and carefully straightened. Their prices range from 11½ cents to 4½ cents per pound for diameters of ¾ inch to 3 inches. A detailed price list will be furnished on application.

The Labor Disturbances.

Labor troubles rise day by day like mountain ranges, each with more formidable front. Originally there was a little trouble among the coal shovellers. Then freight trimmers and bag sewers took a hand. To aggravate the situation and compel submission to their demands, which by this time involved the Old Dominion Steamship Company as a special object of resentment, the Executive Committee of the Ocean Association must needs declare the strike general. This step seems to have been taken only when it became obvious that half-way measures were unavailing. Coal continued to reach the city. Steamships, too, managed to procure their ordinary supplies despite all efforts to deter them. Under an injunction from Judge Shipman, of the United States Court, steamship companies were constrained to receive freight from the Old Dominion ships, rendering the boycott of no effect. At this juncture still another expedient was resolved upon, and on Monday morning delegates from the freight-handlers on the railroad piers on the river front presented a demand to the principal railroad managers for an increase of wages and the redress of several grievances. The paper was presented to the Pennsylvania,

the Jersey Central, the Erie, the Lehigh Valley and other roads that have stations on the water front, and it does not yet appear that any of them will yield without a struggle. The consequence today is that fresh thousands are added to the ranks of idle men. The strikers make no secret now of their intention to extend the disturbance in every possible direction until business and traffic are so paralyzed that the money interests will have to accede to their demands in common protection. The principal demands of the freight-handlers are for 20 cents per hour instead of 17 cents up to 6 o'clock p. m., and 25 cents for overtime. Coupled with these are various stipulations as to who shall be salaried and who discharged, by which they virtually assume to control the shipping of the port.

The crisis now precipitated, and which for magnitude and far-reaching consequences must become historical, none can foresee. Already the trade of the port is paralyzed to an alarming extent. Freight shipments are being suspended in many directions or directed to other points. Manufacturers, too, are seriously menaced. One result quite as likely as any other is, that the stupendous boycott will fall to pieces of its own weight, for every hundred added to the army of the unemployed, whether voluntarily or by the closing of factories, will make more vehement the demand for food, even if the sufferers are compelled to work.

Difficulties in Assisting Labor.

A careful student of social and economic problems, who has given much attention to the relations of employers and workmen, contributes the following article to the discussion which is now engaging so large a share of public attention: That capital is in danger from the unintelligent efforts of labor to improve its condition is evident to all. That some radical cure must be applied is also certain. The important question is—How shall capital direct its efforts in order to avoid the impending evils, and, at the same time, prevent a recurrence of the present labor troubles? The efforts of all employers of labor is directed toward securing a competence. In its most modest form the desire is to secure the comforts of life for the present and put by a sufficient surplus to provide for the traditional rainy day and for old age. The support of the family and the education of the children are included in this. This should be alike the aim of both employer and workman. Unfortunately, in the present condition of the labor market, it is beyond the reach of the workman. So far beyond his reach has it passed that the theory of the trade union does not seem to contemplate such a possibility. The foreign element which is flowing into the country apparently does not dream of anything beyond getting a large price for the fewest possible hours of the most indolent kind of labor. It is to be confessed that on account of these things the greatest obstacle to benefiting the working man is the working man himself. Nevertheless, capital must, in self defense, undertake the task. Capital, instead of confining its thought and labor entirely to its own im-

mediate interest, must embrace its employees in its schemes for money-making. In one sense there must be co-operation, but it will be necessarily one-sided. Nothing is to be expected from the men, as they are not likely to be grateful. Capital must set before itself the task of making so much money that its employees will have the comforts of life suitable for their station; have their children fairly educated, and be taken care of when age or illness prevents them from further labor. In the working man's own scheme the comforts are compressed in working 7½ hours per day and receiving pay for 10 hours, and being paid for every day whether he works or not. As a rule, it may be assumed that the workman does not know what he wants, nor is he able to manage his own income to the best advantage.

The task of thinking and working for labor is undoubtedly a most thankless one. It is rendered so by the prejudices and foolishness of labor on one hand, and capital's fraudulent attempts at benevolence on the other. The effort to improve the condition of the working man must be genuine and present real advantages to him. It cannot be an attempt to get something for nothing. Capital cannot say to labor, "I will take you all into partnership with me, and for the benefit of the concern I expect you to labor 300 hours extra; in return for this I will pay you out of the profits, if any there be, \$6 for your extra work." Such games as that have been tried repeatedly in this and other cities and failed. The insurance scheme of the Pennsylvania Railroad was of this kind. It had only the good of the company at heart, and was perfectly regardless of the men. Much was expected, and much gratitude was asked, but nothing was given in return. A failure was deserved and should have been most signal. Most capitalists have known something about schemes for improving the condition of their men. Most manufacturers labor under the impression that they have made attempts to help their men. I call to mind the case of a firm most notorious for being hard masters. They had repeatedly cut wages at times when there was no real necessity for it. Yet the members of this firm entertain liberal ideas, and really consider themselves among the few who are considerate of their workmen, and in proof point to their encouragement of piecework. Most capitalists, however, are aware of the discouragements which come from any attempt to assist working men of the middle and lower grades. The first obstacle in the way is the intolerance of any interference in private affairs by the "boss," or "old man," or the "company." The man regards his employer as his natural enemy. They are, in his opinion, as bound to quarrel as cat and dog. To have a feeling of gratitude toward an employer is a weakness of which he is ashamed, to say the least. The smaller the man's wages the less will he tolerate any assistance which does not take the form of a permanent or an actual increase in the amount of pay for a given quantity of work.

Among certain classes a lack of intelligence prevents them from comprehending the honest attempts of capital to benefit labor. The greatest obstacle, and one which is utterly implacable, is the trade union and its ideas of the universal equality of men. Each man is regarded as a unit to be paid a certain sum every day. He is also a machine which must not be allowed to exceed a certain product in a given time. Further, the unwritten law of the union regards the employer as an enemy who must be controlled, mainly for the benefit of the union leaders. It may be well to illustrate the latter point by an incident which occurred in a neighboring State not long since. Some of your readers may recognize the circumstance. In the middle of the execution of a fine contract, a manufacturer was waited on by a man who was reputed to be one of the leading lights of the union. He announced that unless the wages of the men were raised there would be a strike, and that the men were prepared to go to any lengths. The manufacturer recognized the man, guessed that he had a price, and boldly said "How much is it going to cost to keep things quiet here?" There was a moment's hesitation and then a sum was named (we think, \$250). The manufacturer assented and said he would pay one-half on the spot by a check and the remainder when his contract was finished. A check was drawn and handed over. The manufacturer was assured that there would be no trouble. And no trouble was made, the contract was finished and the last payment made. In the meantime the fellow made fast friends with the men by circulating a rumor of a reduction of wages. This was followed by an interview with the proprietor, some threats and a final report to the men that the matter was settled and there would be no reduction of wages. Naturally, any scheme which comes from the manufacturer which is to benefit the laborer and will bring the interest of the two parties into harmony will be most bitterly opposed by all interested in the labor unions. The success of such a scheme means the downfall of the unions. The unions will oppose all the capitalist may do, and use every effort to frustrate his labor; their very existence depends upon doing this.

The discouragements which will be met in any attempt at improving the condition of the laboring man are far greater than can be shown in a single article. Great as these difficulties are the work must be undertaken, and undertaken by all. The small manufacturer as well as the large capitalist, the private corporation as well as the railroad company, must individually take up the task. Each must work in his own way, but all for the same end, since the same danger imperils all capital and all industry. The question which is most naturally asked is, "What shall we do? How shall we proceed?" To answer such a question is as difficult as it would be to frame a reply to the question "How shall we conduct our business?" Though a categorical answer may not be within my power, I may be able in the future to throw light upon the dangers to be avoided and, to a certain extent, get a definite outline for our ignorance, and thus render substantial aid to those who are about to undertake what may well be called a new crusade. W. E. P.

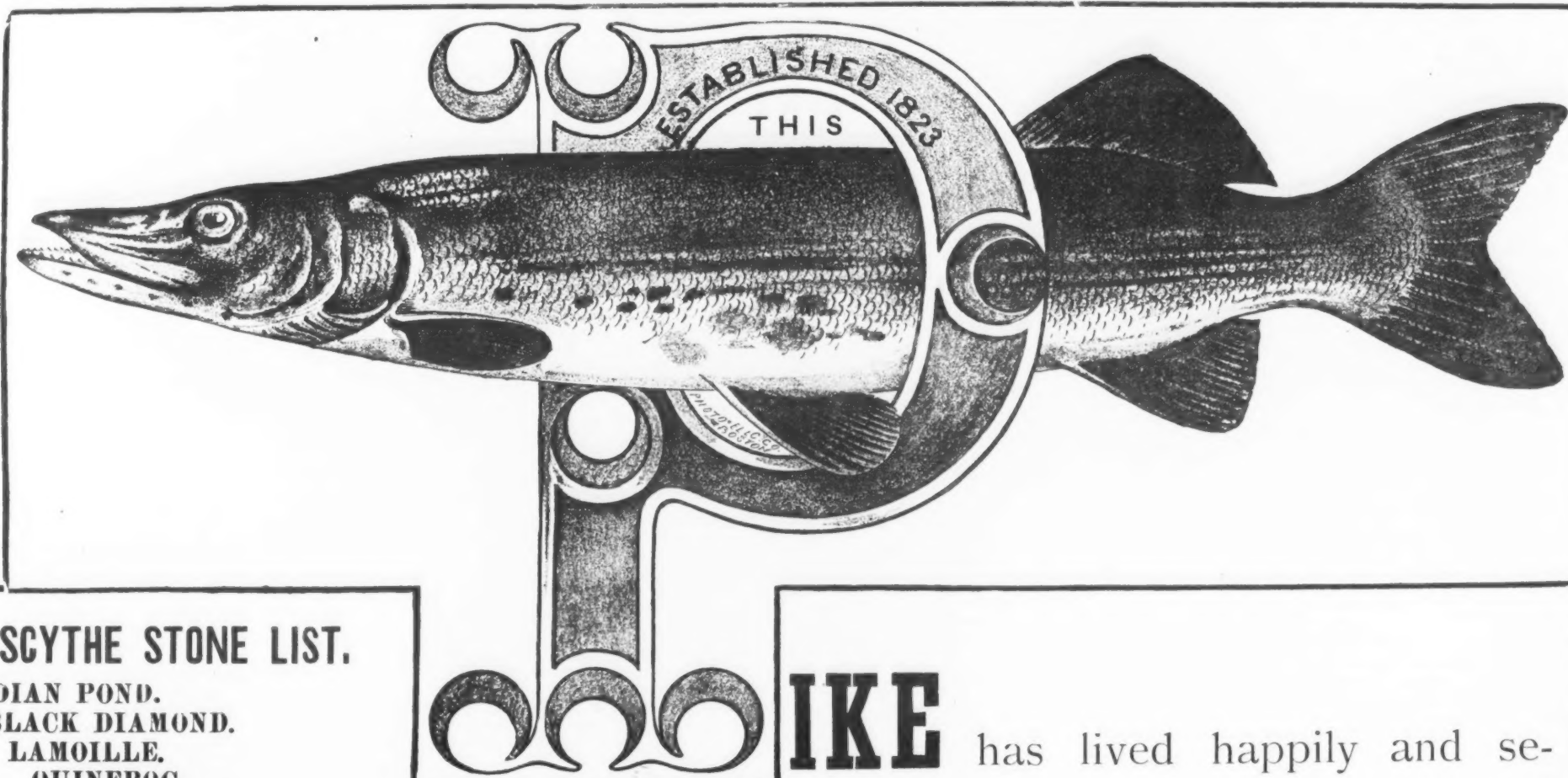


SIR JOSEPH WHITWORTH.

cost in the first half of 1886. This advance will not hold good for any great length of time. Of the many projected railroads, and new and costly improvements, many will fail of accomplishing what they start out for, because history is always repeating itself. Many new concerns will be unable to float their bonds. Some projections run through, to and over so thinly settled portions of the country that for the first few years they will be hardly able to earn running expenses, and the sudden demand for great quantities of rails, pig iron, cars, locomotives, bridge irons, &c., has had the effect to set many persons who have never been bitten almost wild. As a result prices have been sent up far above what they will be able to bear for any great length of time, and therefore we may expect to import in the year 1887 fully 1,500,000 tons of iron and steel in its various forms into the country, at a cost to the country of from \$50,000,000 to \$60,000,000. I make this as a prophecy in advance, and just about the time that some of our new works and furnaces get ready for operation the bottom will drop out again, as it has done several times in the past 50 years, and they come in again the old story—"the survival of the fittest." I make this note of warning as an old observer through your paper, which has always seemed to me to take a conservative view of things. The indications are that we shall consume over 225 pounds of iron and steel per capita the present year. There is no country on the face of the earth that can stand such a consumption in times of peace without producing a violent reaction. This is more especially true when the products of agriculture are so low in value as to be able to bear only moderate costs for transportation. It will be well for many establishments to scan credits closely and to keep sails ready to furl quickly, to be ready to meet any emergency. I am very truly yours, C. S.

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 135 North 3d Street, Philadelphia.

FIRE!

We take pleasure in announcing to our friends that we have thoroughly overhauled and assorted our damaged stock and are now in position to fill orders with new goods in clean packages. Damaged goods and seconds will go to auction or be sold as they are, in job lots.

WHEELING HINGE CO.

FOR SALE,

one 18 x 18 Upright Marine Engine, also one Worthington Duplex Brass Lined 24 x 10 1/2 x 10 Steam Pump. Both complete and in good order, Newham, Nork & Douglas.

FRONT & DICKINSON,
 Philadelphia.

WANTED,

a thorough Builders' Hardware man, possessing business experience with executive ability. Apply by letter only, giving age, experience, salary expected and references to

HOPKINS & DICKINSON MFG. CO.,
 P. O. Box 147, Brooklyn, N. Y.

IRON MINE FOR SALE, or Lease for a term of years on favorable conditions; a large and valuable deposit of Spathe (Carbonate) Ore. This Mine is a half-mile from dock on the Hudson River and adjoins the well-known Mines of the Hudson River Ore and Iron Company.
 Apply to JOHN O. HOYT, JR.,
 96 Broadway, N. Y.

MR. JOS. R. HICE, Salem, Columbiana County, Ohio, ran his puddling wagon for seven years on an average of 3 pounds of Dixon's Ever-lasting Graphite Grease per year. Estimated distance run, 44,000 miles. On having a new wagon built the maker advised him to use the old axles—the spindles were so true and in such fine condition.
 JOS. DIXON CRUCIBLE CO.,
 Jersey City, N. J.

To Boiler Manufacturers.

Wanted two or three Manufacturers in widely separate districts to manufacture and sell a superior Water Tube Boiler on royalty. Secured by patent and now being made in England. Particulars given by

PHILIP S. JUSTICE & CO.,
 14 N. Fifth St., Philadelphia.

IMPORTANT FOR MILLERS.

ROLLER MILL

for grain and middlings, built by Messrs. Nagel & Kaemp, Hamburg, Germany. For particulars apply to

ECKMEYER & CO.,
 42 Beaver St., New York.

A Locomotive For Sale Cheap.

One (1) Standard Gauge (4 ft. x 8 1/2 in.) Engine; size of Cylinders, 14 1/2 in. x 22 in.; Four (4) 6 ft. 6 in. Drivers; Weight on drivers, 34,000 pounds; total weight on Drivers and truck, 60,000 pounds; Knipp Tires 3 1/2 in. thick. Apply to

SWARTZ & NATHAN,
 551 to 557 State St., Chicago, Ill.

FOR SALE.

An established and profitable Hardware Sash, Door and Blind business in one of South Florida's very best towns; two railroads already here and one to break ground from this point to the Gulf in March. Stock which is clean and new will invoice between \$5000 and \$7000.
 Address "STEEL NAIL,"
 Office of The Iron Age, 66 and 68 Duane St., N. Y.

FOR SALE—A Locomotive Boiler, 100 Horse-Power, first-class condition. Apply to FRANK McSWIGAN, No. 1 Bridge Street, Corner of Dover and Franklin Squares, New York.

WANTED—Foreman for Pattern Shop of an Architectural Iron Works, making a specialty of iron stair work and ornamental work for buildings. Must have ample experience, and thoroughly familiar with the reading and carrying out of plans.
 Address with full particulars, "E. T. G.,"
 Office of The Iron Age, 66 and 68 Duane St., N. Y.

ROBT. MOFFLY & CO.
 have removed their offices from 312 Stock Exchange Place, to their Yard, N. E. corner Ninth and Jefferson streets. Mr. Robt. Moffly still continues a Member of the Philadelphia Stock Exchange.

WOULD LIKE to correspond with traveling salesman for Hardware Store or Jobbing House, as to carrying extra article on road; quick sales and first class profits.
 COMFORT COOKER MFG. CO.,
 71 & 73 Washington Street, Buffalo, N. Y.

FOREMAN TO A B-X SHOP WANTED.—A man capable of taking charge of machinery and general supervision of a shop making wooden packing boxes. Apply at once to CHAPMAN & DEWEY, Security Building, Room 20, Kansas City, Mo.

Special Notices.

FOR SALE.

Rolling Mill Machinery

One 10-inch Guide Mill, three high, including 30 pair Roll s and 4 pair Housings.
 1 no Squeezer.
 Plates for 1 Scrap and 3 Rolling Furnace s.
 One set Muck Rolls, Housings and Rolls, M. M. Shaft Fly-Wheel and connections.
 One Engine 4 x 4 with Sturtevant Fan.
 Four pair Muck and Bar Iron shears.
 Roll Lathe, Tools, Buggies, Floor Plates.
 One large Engine 28 in. x 60 in. with Fly Wheel Gearing, &c.
 Five 2-flue Boilers 26 x 36 in.

Address

BLOCK & POLLAK,
 CINCINNATI, OHIO.

THE RECEIVERS OF

The Philadelphia and Reading Coal and Iron Co.

Offer for lease or for sale the following

BLAST FURNACES:

EAST PENN. FURNACES, a twin plant, which can be operated as two small furnaces of moderate size or made into one furnace of larger dimensions, located at Lyons Station, Berks County, Pa., on East Pennsylvania Branch of P. & R. R. R.
 PORT CARBON FURNACE, a large, well-equipped plant located in the borough of Port Carbon, Schuylkill County, Pa., near Ottaville, on the Schuylkill Valley Branch of the P. & R. R. R.
 RINGGOLD FURNACE, at New Ringgold, Schuylkill County, Pa., on the Little Schuylkill branch of the P. & R. R. R., ten miles from Tamaqua.
 KUTZTOWN FURNACE, at Kutztown, Berks County, Pa., on the Tipton Branch of the P. & R. R. R.
 MONACOY FURNACE, located at Monocoy, Berks County, Pa., 27 miles from Philadelphia. Has both rail and canal facilities.
 WINTER FURNACE, located in the city of Harrisburg, Pa. Has both rail and canal facilities.
 POWHATAN FURNACE, located in Henric County, Virginia, on the James River and the Richmond and Allegheny R. R., six miles from Richmond, operated by water-power machinery.
 Communications respecting the above should be addressed to

A. A. McLEOD,
 General Manager P. & R. R. R. Co.,
 Philadelphia, Feb. '87. 227 South Fourth St.

TO MANUFACTURERS SEEKING A LOCATION:

Look at Earville, Ill.; two railroad lines to Chicago; direct communication with all Western and Northwestern points by Chicago, Burlington and Quincy, and Chicago and Northwestern systems. Cheap coal; two short lines to coal fields, one to Streator, Ill., one to Springfield Valley and La Salle, Ill. H. W. SANIER,
 Cor. Secretary of Earville Industrial Association, Earville, Ill.

FOR SALE.

A fine new Stock of Shelf hardware and farmers' Tools. Will invoice about \$3000. In a good store-room and warehouse attached. Healthy location; population about 5000; two railroads; County seat; only one other hardware store in town. Best of reasons for selling. Address J. E. ANNIS,
 Cambridge, Ohio.

SECOND HAND,

CHEAP.

1 Planer, Planes 11 ft. x 44 in. wide.
 1 1/2 x 24 Planer.
 1 Planer, 3 ft. 15 x 12 in.
 1 1/2 ft. bed, 28 in. Putnam Lathe.
 1 10 ft. 27 in. Engine Lathe.
 1 Engine Lathe, 8 ft. x 22 in., with chuck, &c.
 1 Engine Lathe, 6 ft. x 18 in.
 1 No. 4 Brainard Universal Miller.
 1 Monitor Head Lathe.
 1 Fox Lathe, all attachments.
 1 20 in. Upright Drill. Good as new.
 1 Double-acting Power Press.
 1 4-spindle Garvin Drill.
 1 16 in. Cutter, Cuts 3/4 in. to 1 in. Bolts.
 Send for List of Second Hand Tools.

New York Machinery Depot,

Bridge Store No. 16, on Frankfort St., New York.

17 WARREN STREET,
 NEW YORK, February 1, 1887.

The Copartnership heretofore existing between the undersigned under the firm name of W. I. & S. G. NEGUS & Co. expires this day by limitation. Samuel G. Negus retiring. William I. Negus and William B. C. Carpenter, under the firm name of W. I. Negus & Co., will continue the business of the former firm. Either or the undersigned sign in liquidation of the firm of W. I. & S. G. Negus & Co.

WM. I. NEGUS,
 SAM'L G. NEGUS,
 WM. B. C. CARPENTER.

WANTED,

a Cutlery man who has had experience in Pennsylvania or Ohio and Michigan. Address, stating terms, experience, &c., "CUTLERY,"
 Office of The Iron Age, 66 and 68 Duane Street, N. Y.

Wanted,

a competent Manager to take charge of, and an interest of \$5000 in, large and well-established Foundry and Machine Works, conveniently located near the city of Troy. They are well equipped for all kinds of work, particularly for heavy work; running steady day, and work to be had to full capacity by a practical and energetic manager. All communications strictly confidential. Address J. H. WINSLOW & CO., Troy, N. Y.

WANTED by a New York house to represent a manufacturer of heavy hardware, suitable for railroads or contractors.
 "RAILROAD,"
 Office of The Iron Age, 66 and 68 Duane St., N. Y.

SITUATION WANTED—Man of long experience in general and builders' hardware, also cutlery. Would like position as traveler or otherwise. Address "E. L. A.,"
 137 Broadway, New York, Room 20.

WANTED—Situation by a practical Stove Iron Pattern Fitter. Capable of taking charge of work. Several years' experience.
 Address "STOVE FITTER,"
 Office of The Iron Age, 66 and 68 Duane St., N. Y.

Special Notices.

BOOKS.

Tools and Machinery.

Hand-Saws; Their Use, Care and Abuse. How to Select and How to File Them. 75 illustrations, 96 pages, 12mo, cloth. By F. T. HODGSON, \$1

Treatise on Toothed Gearing. Containing Complete Instructions of Designing, Drawing and Constructing Spur-Wheels, Bevel Wheels, Lantern Gear, Screw Gear, Worms, &c., and the Proper Formation of Tooth Profiles. By J. H. CROMWELL, \$2

Treatise on Belts and Pulleys. Embracing Full Explanations of Fundamental Principles, Proper Disposition of Pulleys, Rules for Determining Widths of Leather and Vulcanized Rubber Belts and Belts Running Over Covered Pulleys, Strength and Proportions of Pulleys, Drums, &c. By J. H. CROMWELL, \$2

Plumbing and House Drainage.

House Drainage and Water Service. 5th edition, 3 folding plates and 30 illustrations, 365 pages, 8vo, cloth. By JAMES C. BAYLES, \$3

Water-Closets—A Historical, Mechanical and Sanitary Treatise. 252 illustrations, 158 pages, 12mo, cloth. By GLENN BROWN, \$1

Hints on the Drainage and Sewerage of Dwellings. 282 illustrations, 302 pages, 12mo, cloth. By W. P. GERHARD, \$2 50

Electricity in the Service of Man; A Popular and Practical Treatise on the Applications of Electricity in Modern Life; from the German, with copious additions. By A. R. VON URBANITSKY, \$6

Gas Fitting; A Practical Handbook, Treating of Every Description of Gas Laying and Fitting. By J. BLACK, \$1

Any Book Published

will be sent, postpaid, to any address on receipt of price by

DAVID WILLIAMS,

Publisher and Bookseller,

66 and 68 Duane Street, New York.

AUCTION NOTICE!

HAYDOCK & BISSELL,

WHOLESALE AUCTIONEERS,

Nos. 12 Murray St. and

15 Park Place, New York.

Wednesday, Thursday and Friday, Feb.

9th, 10th and 11th, 1887.

On a credit of 90 days, without interest for approved paper.

IMPORTANT AUCTION SALE

OF

Table and Pocket Cutlery,

by order of the Manufacturers and Importers; also by order of C. S. Landers, Trustee, the entire remaining stock of finished goods of The Bridgeport Knife Co.

This sale will comprise about 40,000 dozen Table and Dessert Knives and Forks First and Second Quality; desirable patterns. 4000 pair Carvers, in Ivory, Bone, Ivoride, Rubber, Stag, Ebony and Cocoa Handles. 10000 dozen Table, Medium and Dessert Knives only, in Ivory, Bone, Ivoride, Rubber and Plated Handles. 1200 dozen butcher, Bread, Cheese and Pallette Knives. 2500 dozen Pocket Knives, Scissors and Shears. Large line silver-plated Spoons, Forks and Knives.

Cases A sorted Knives and Forks, &c., &c. This sale will be worthy the attention of the Trade. The entire catalogue will be sold without reserve. For the information of the trade we are instructed to print the following:

"Office of Charles S. Landers' Trustee, BRIDGEPORT, Jan. 25, 1887.

"Dear Sir:—The goods to be offered by you for the sale of February 9th, 10th and 11th, and which will be sold without reserve, comprises the entire remaining stock of this brand of goods, and no more goods will be made at the Bridgeport Factory."

"Yours respectfully,"

"C. S. LANDERS, Trustee."

ROLLING MILL MACHINERY

FOR SALE CHEAP.

1 Vertical Engine, 30x30 Cyl., heavy Fly Wheel.

1 Scrap Rail Shear and Engine.

1 Heavy Rail Punch and Engine.

1 Heavy Scrap Churn and Engine.

1 18 in. Muck Train Pinions and Housings.

1 18 in. Rail Finishing Train Pinions and Housings.

1 Double Frame Morgan Hammer 5000 lb. blow, 18 in. dia. Steam Cylinder.

1 Battery Rollers 2, 4x18 feet, 2 flue Boilers and all connections.

1 14x24 Cyl. Box Bed Engine and Band Fly Wheel.

1 18x30 Box Bed Engine with Fly Wheel.

HARNEY & KILBY,
 SANDUSKY, OHIO.

AUCTION SALE

of Prentice's Hat Factory, Thursday, Feb. 10th, 1887.

Pair of Wright Automatic Engines 22 in x 44 in., 300 H. P. Two Boilers 6 feet diameter, 18 ft. long and 64 in. tubes. 5 Boilers 4 ft x 16. 70 Tons Pulleys, Shafting, Hangers, 20 Tons Piping, assorted sizes. 2 Screw Cutting Lathes. 2 Engines 10 x 16 and 8 x 12. Large Sturtevant Blower. Berryman Heater and Pipe. 130 ft. 24 in. Double Belt. 4 Large Tanks, &c., &c.

NOSTRAND AVE., Near Myrtle,
 Brooklyn, E. D.

9-INCH TRAIN & ORE CRUSHERS.

FOR SALE,

one 9-inch Train complete, and two Hydraulic Ore Crushers, for cash or in exchange for scrap iron.

THOMPSON C. GILL & CO.,
 Dealers in Scrap Iron, 210 So. Third street,
 Philadelphia, Pa.

WANTED,

a second-hand heavy Punching Press.

BAKER CHAIN & WAGON IRON MFG. CO.,
 Beaver Falls, Pa.

Trade Report.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, February 2, 1887.

Scotch Pig.—At the close the market is weaker, and makers' brands are quoted as follows, about 6d. lower than last week:

Coltness, alongside, Glasgow, 59/100 lb.
 Langloan, " " " " 58/100 lb.
 Glencarnock, " Ardrossan, 58/100 lb.
 Gartsherrie, " Glasgow, 58/100 lb.
 Shotts, " at Leith, 58/100 lb.
 Dalzellington, " Ardrossan, 58/100 lb.
 Cambrose, " " " " 58/100 lb.
 Carriage from Ardrossan to Glasgow is 1/10 ton.

Cleveland Pig.—The market is irregular, No. 3 Foundry having fallen off to 36/ @ 36/6, as against 37/6 @ 37/9, last week, while No. 1 is 39/; No. 2, 38/ and No. 4 Forge, 34/.

Bessemer Pig.—W. C. Hematites are weaker, mixed lots, Nos. 1, 2 and 3, having dropped to 49/ @ 50/.

Bessemer Blooms.—Blooms, 7 x 7 inches, remain unchanged at 80/ @ 85/ at shipping ports.

Manufactured Iron.—The market is a little steadier. Prices may be quoted as below:

	£	s.
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Trade Report.

shorter hours. Eastern business firms complain of delay in freight shipments, and the fuel question causes much apprehension in Fall River, Lowell and other manufacturing points. In breadstuffs a flurry was caused on Tuesday by war news from Europe. The market closes weak. Provisions are quiet; cotton is dull, but options are more active. Coffee is quiet, options lower. India rubber quiet. In leather moderate trading. Hemp dull; tobacco quiet; raw sugar moderately active and steady; petroleum steady. In ocean freights there is a slack demand.

The Stock Exchange markets have been unsettled and lower, due to labor troubles and free sales by London operators. The latter was prompted by warlike demonstrations in Germany in the first instance, and later by a panic on the Paris Bourse. On Monday the market was started downward by the freight-handlers' strike, and the same influences had a depressing effect on Tuesday, but there was improvement at the close when it appeared from the weekly export statement that the effects of the strike had been exaggerated. To-day prices were strong and higher. Among other influences the coal companies reported that their troubles were practically over, and the ocean steamers were experiencing less difficulty. Quotations are as follows: Cameron Iron and Coal, 46 1/4; Canada Southern, 54 1/4; Canada Pacific, 63 1/4; Consolidated Gas, 86 1/4; Delaware and Hudson, 102; Denver and Rio Grande preferred, 59 1/4; Erie, 30 1/4; Erie preferred, 67 1/4; Louisville and Nashville, 60 1/4; Michigan Central, 87 1/4; Manhattan Consolidated, 156; Missouri Pacific, 105 1/4; New York, Susquehanna and Western preferred, 31 1/4; Pacific Mail, 50 1/4; St. Paul, 87 1/4; Lackawanna, 134; Cons. Gas, 86 1/4; Lake Shore, 92 1/4; New England, 58 1/4; Jersey Central, 65 1/4; Reading, 36 1/4; Richmond Terminal, 44 1/4; St. Paul, 87 1/4; Union Pacific, 56 1/4; Western Union, 72 1/4; New York Central, 111.

United States bonds closed as follows:

	Bid.	Asked
U. S. New 3's	100	100 1/4
U. S. 4 1/2, 1891, registered	109 1/4	109 3/4
U. S. 4 1/2, 1891, coupon	108 1/4	108 3/4
U. S. 4, 1907, registered	128 1/4	128 3/4
U. S. 4, 1907, coupon	128 1/4	128 3/4
U. S. Currency 6s, 1895	126	126 1/4
U. S. Currency 6s, 1896	128 1/4	128 3/4
U. S. Currency 6s, 1897	131 1/4	131 3/4
U. S. Currency 6s, 1898	134 1/4	134 3/4
U. S. Currency 6s, 1899	136 1/4	136 3/4

Sterling is quiet. The demand for bills to remit against sales of stocks on foreign account caused an advance for bills, so that gold is within 1/2 cent of the exporting point. The posted rates are 4.86¢ @ 4.89¢.

Reports from Washington are to the effect that Treasurer Manning will relinquish his office the coming spring, to accept the presidency of the Western National Bank of New York, an institution said to be in process of organization, and that Mr. C. E. Jordan will be vice president. Mr. Fairchild is spoken of as Mr. Manning's probable successor.

The Interstate Bill has been returned to the President by the Attorney-General accompanied by a statement of his opinions, and the President is said to accept it as an expression of the will of the people. Its practical construction will remain with the courts. The trunk line presidents will meet February 3, to determine upon their future course.

The imports of merchandise at this port for the week were \$198,000 below those of the previous week, the valuation being \$7,529,000, making a total since January 1 of \$32,931,287, as compared with \$31,000,000 for the corresponding period last year, and \$35,342,000 in 1885. The exports were \$433,000 above those of last week, the total valuation being \$5,919,566, making the total since January 1, \$23,650,238, as compared with \$29,571,000 for the same time last year, and \$36,135,000 in 1885. The items include 149,401 barrels flour, 544,998 bushels wheat, 414,185 bushels corn, 18,070 bales cotton, 8,814,792 gallons petroleum, 8,933,682 lb cut meats, 3,666,743 lb lard. According to the Custom-House statement the exports of specie from this port last week were \$368,124, making a total since January 1 of \$1,118,825, against \$3,464,162 for the same time last year, and the imports were \$88,000, making the total since January 1, \$3,243,000, compared with \$915,000 for the same time last year.

The Mechanical and Trades Exchange of this city elected officers as follows: President, De Witt C. Weeks; vice-president, Albert G. Bogert; treasurer, Gilbert C. Burnett; secretary, Edmund A. Vaughn.

The scheme for a consolidation of the New York Cotton and Coffee Exchanges meets with much opposition.

The city debt is as follows: Amount held by sinking fund, \$38,294,958.10; amount held by public, \$93,306,145.47; total funded and temporary debt, \$131,601,103.57.

Among the leading subscribers of the Aniston Company were Lehman & Co., cotton merchants, of New York, Montgomery, and New Orleans; William H. Woods, capitalist, New York; Frederick Taylor & Co., brokers, New York; Alfred Tyler, capitalist, New York; P. J. Goodheart & Co., bankers, New York; Jefferson M. Levy, New York; and L. Napoleon Levy, relatives of the late Commodore Levy.

NEW YORK.

Considering the many influences adversely affecting it, the Iron trade has during the week borne up wonderfully well. One of the great lines in which this market is the leading one in the country at the present time, the import trade, has maintained activity in spite of drawbacks. Among these are the frequent war scares in Europe, which have made the future very uncertain for importers, some of whom have been in producing war clauses into contracts, expecting that business would be cut off for the present. This has not occurred, sales having been made on this basis. Then there has been the effect of the Interstate Commerce Bill in at least temporarily stopping business for future delivery at interior Western points, only lake points being accessible, and, furthermore, the bad report of strikes, with the possibility of disturbances in the Western Iron and allied trades this summer.

American Pig.—The situation remains practically unchanged, both demand and supply being limited. Transactions continue to be confined to small lots, though it is urged that consumers are using more iron than they expected to, and will have to come into the market earlier to replenish supplies. As yet there are no indications of this. We quote nominally, for moderate-sized lots of standard to choice brands, \$22 @ \$23 for No. 1 Foundry, \$20 @ \$21 for No. 2, and \$18.50 @ \$19 for Gray Forge.

Scotch Pig.—The bulk of the Scotch Pig now arriving was bought by importers before the rise, most of it being sold at a good profit. The decline on the other side has not yet materially affected our market, which could not and did not follow it in the advance preceding it. We quote for moderate-sized lots as follows: Coltness, \$23.50; Glengarnock, \$22.50; Shotts, \$22.50; Summerlee, \$22.50 @ \$23; Carnbroe, \$22; Clyde, \$21 @ \$21.50; Dalmellington, \$21 @ \$21.50, and Eglington, \$21, all to arrive.

Bessemer Pig.—The much-discussed sale of Bessemer Pig for the South turns out to have been less than 4000 tons instead of 40,000 tons. Our Chattanooga correspondent gives the facts in the case. We note a sale of 4500 tons Spanish Special Open-Hearth Pig for the West.

Spiegel Eisen.—The market is quiet, with quotations at \$27.50 @ \$28.50 for 20%. We note a sale of 4000 tons of 30% to a Western point, second half of the year.

Bar Iron.—There has been considerable activity, and we have a few very large lots placed and in the market, chiefly for car-work, which is now coming on the market very quickly. We understand that in the car shops of the country there are now being built not less than 60,000 cars, with large orders still pending. It must not be forgotten, however, that we are now very close to the importing point. We are informed that fair Staffordshire Bars can be now laid down here at 2.25¢. The local stores advanced store prices to \$2.20 for Common and \$2.40 for Refined. We quote: Common, 2.00¢ @ 2.10¢; Medium, 2.10¢ @ 2.15¢, and Refined, 2.20¢ @ 2.50¢, in round lots on dock.

Structural Iron.—The works are crowded, and thus far it is chiefly for bridges and cars, the latter taking considerable quantities of Channels. The indications of a heavy demand with approaching spring for building purposes are now multiplying, and the future is assured for some time to come. In fact, the activity which thus far has characterized the cruder materials is now turning to the finished products. We quote according to quality, for Angles, 2.40¢ @ 2.50¢, delivered, and Tees at 2.75¢ @ 2.9¢, for round lots. Steel Angles are quoted 2.50¢ @ 2.70¢, according to quality. Store quotations remain 2.75¢ @ 2.85¢ for Angles and 3¢ for Tees. American Beams and Channels have been advanced to 3.3¢ base from dock for all orders.

Plates.—We quote for round lots: Common or Tank, 2.45¢ @ 2.6¢; Refined, 2.50¢ @ 2.60¢; Shell, 2.7¢ @ 2.8¢; Flange, 3.7¢ @ 3.8¢; Flange, Extra, 4 1/4¢ @ 4 1/2¢. For small lots of Steel Plates the quotations are as follows: Tank, 2.90¢ @ 3¢; Ship, 3¢; Shell, 3 1/4¢ @ 3.50¢; Flange, 3.60¢ @ 3.75¢, and Fire-Box, 4.40¢ @ 4 1/2¢, on dock.

Steel Rails.—The week has been a very quiet one. Orders for delivery up to the middle of summer are few and far between, but those that do come into the market find it a very difficult matter to place even small lots at the nominal quotation of \$39 @ \$40 at Eastern mill. For later deliveries a number of large inquiries are noted, but none have as yet been placed. The Roane Iron Company are getting ready to take orders. There is much difficulty in getting freights from English ports to New Orleans, now that the cotton-shipping season is drawing to a close, and it is likely that Foreign Rails will not be available so cheaply at Gulf ports as they have been for that reason.

Billets.—The market remains strong and fairly active, a number of sales aggregating a few thousand tons having been made, among them a 1000-ton lot at \$32.50 for delivery late in the year to a Western point. Early delivery is inquired for, but difficult to place.

Wire Rods.—The market has been more active, sales aggregating 3000 to 5000 tons having been closed during the week, among them the last one of 1000 tons containing war clause and buyer's risk of duty at \$42.50. Thus far little business has been done for delivery after the opening of navigation.

Old Rails.—Pressure to sell a number of lots, spot and afloat, and lower cable offerings for shipment have weakened the market. We note sales of small lots, spot and afloat, aggregating about 1500 tons, for which from \$24.50 to \$25 have been paid; also a number of larger lots for lake deliveries, among which one of 1000 tons, including war clause. A 5000-ton lot for New Orleans inquired for could not be placed on account of scarcity of vessels to that port, 15/ having been paid for a recent charter. Lots for shipment are not wanted, consumers being well supplied for the present and for some time to come. They are generally inclined to hold off to await indications concerning the important question, whether or not large offerings of Domestic Old Rails will be made in the spring. We quote \$24.50 @ \$25 for T's, and \$25.75 @ \$26 for Double Heads.

Scrap.—Yard lots are available at \$25 @ \$26, while foreign shipments are offered at \$24, with little business doing.

Rail Fastenings.—Railroad Spikes have been advanced to 2.75¢, while Boat Spikes are higher by \$2 1/2 ton. We quote Spikes 2.60¢ @ 2.75¢ delivered. Angle Fish Bars may be quoted 2.20¢ @ 2.25¢. Bolts and Square Nuts are 3.10¢ @ 3.20¢, and Bolts and Hexagon Nuts 3.25¢ @ 3.35¢.

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, February 1, 1887.

Pig Iron.—As regards this department of the Iron trade it may be said that prices are higher than they were a week ago. Transactions have been quite small, however, as there is but little iron for sale and not a great deal wanted at the prices now asked. For the time being there is no question that sellers are in full control of the market, and can name their own figures within reasonable limits. How long this will continue will depend in a great measure on the condition of foreign markets. Some large consumers are already bringing in a little foreign iron by way of experiment, but there is not much advantage in it at present prices. One of the large Pipe founding firms bought 10,000 tons Middleboro' No. 3 some time ago, another (the Enterprise Mfg. Company) brought in 600 tons sample lots of Scotch Irons, but the advance on the other side brings prices pretty well up to our own. At the same time a slight advance here, or a little shading in foreign quotations, would certainly lead to a good many purchases of the grades above mentioned. At the moment, therefore, the position appears to be a very critical one, and while circumstances may warrant higher prices later on, they certainly do not warrant them now. Scotch brands of the highest reputation are offered at about \$22, and Middleboro' No. 3 at about \$18.50, and although these cannot be used indiscriminately they displace just so much American iron. There may be quite an advance in foreign markets, but it would be a matter of deep regret if that advance should be based purely on sales for American account. With the increased facilities for home production, a good portion of which will soon be made available, there ought to be plenty of iron for every one, and there doubtless will be, if buyers are not too anxious about it. Latest sales reported were at \$20 at tide for Gray Forge; \$20.50 for No. 2, and \$22.50 @ \$23 for No. 1 Foundry. These figures seem rather high, but there is so little offering that any one who must buy for immediate wants cannot do much better. Large buyers, of course, are not in the market at any such prices, but it is by no means certain that they will do better when they have to renew their contracts. The next 30 days will pretty well determine the course of the market. If consumption proves to be running neck and neck with production, there will be very little chance for lower prices; but if there are any indications of surplus, it will not be long before it shows itself in lower quotations. Prospects at this time are all favorable, the danger as we have endeavored to show, is from outside sources, and it will be well to bear in mind that the market is so very near to being under foreign control that 50¢ to \$1 7/8 ton more might make it absolutely so.

Foreign Iron.—There is not much business doing, but prices are firmly maintained. There are several inquiries in the market for several 10,000-ton lots, but no sales so far as known. Asking prices, \$21.50 @ \$22 for Bessemer, \$28.50 @ \$29 for 20% Spiegel and \$32.50 @ \$33 for 30%.

Blooms.—Firm and unchanged. Some sales have been made, it is said, on the basis of the following quotations: Rail Blooms at \$30.50 @ \$31 c.i.f., duty paid; Nail Slabs, \$33.50 @ \$34; Sheet-Iron Billets, \$35 @ \$37; higher qualities for Boiler Plate, &c., \$38 @ \$44. American Blooms as follows: Charcoal Blooms, \$55 @ \$56; Runout Anthracite, \$46 @ \$47; Scrap Blooms, \$36 @ \$37, and Ore Blooms, \$36 @ \$36.50.

Muck Bars.—The mills are close sold up and \$34.50 @ \$35 f.o.b. cars is a firm quotation for good quality bars.

Bar Iron.—There has been a good demand all through the week, and prices are firmly maintained. Mills are full of work, and the product seems to go direct into consumers' hands, so that there are no accumulations to be found anywhere. Some people are talking higher prices again, but it will do no harm to wait a couple of weeks or longer to see what the spring trade may bring forth. Everything looks well at present, but sudden changes may occur, and if favorable to holders there will be no difficulty in making an advance then; but an advance that cannot be maintained would be very injurious. Prices for Best Refined Bars are 2.2¢ @ 2.3¢, medium quality, 2¢ @ 2.1¢. Skelp, 2¢ @ 2.25¢ for grooved, and 2.45¢ @ 2.50¢ for Sheared.

Plate and Tank Iron.—A very fair business has been done during the week, and at very firm quotations, too. The mills are about as busy as they can be, and prospects are considered unusually favorable for spring and summer business. The average of sales would probably show better prices than were realized during the preceding week, although nominally unchanged, as follows: Ordinary Plate, 2.50¢ @ 2.55¢, delivered; Tank, 2.5¢ @ 2.6¢; Shell, 2.75¢ @ 2.85¢; Flange, 3.5¢; Fire-Box, 4.25¢; Steel Plates, Shell, 3.25¢; Flange, 3.5¢; Fire-Box, 4 1/4¢ @ 5¢.

Structural Iron.—Business continues to be entirely satisfactory to sellers, and plenty of work is offered at about present prices. Only a moderate amount has been taken, however, because the mills are very full for some time to come, and are not desirous of taking on much more in the unsettled condition of affairs now prevailing. Prices firm at the following quotations: 2.5¢ for Bridge Plate; 2.30¢ for Angles; 2.8¢ @ 2.9¢ for Tees, and 3.3¢ for Beams and Channels.

Sheet Iron.—The demand has been very large considering the season, and prices are gradually stiffening. In some instances orders for large lots have been declined, on the ground that it is not thought desirable to sell for deliveries later in the season. For such lots as are wanted at once, the following figures are quoted on the best makes:

Best Refined, Nos. 26, 27 and 28	4 1/2
Best Refined, Nos. 18 to 25	3 1/2
Common, 1/4 less than the above	
Best Bloom Sheets, Nos. 25 to 28	4 1/4 @ 5 1/4
Best Bloom Sheets, Nos. 22 to 25	4 1/4 @ 4 1/2
Best Bloom Sheets, Nos. 16 to 21	3 1/4 @ 4 1/4
Blue Annealed	3 1/2
Best Bloom, Galvanized, discount	57 1/2
Common, discount	63 1/2

Steel Rails.—The demand is fair, but there are so few sellers that orders are exceedingly hard to place. Prices are nominally \$39 at mill, but it is doubtful if any thing of importance could be had at less than \$39.50 @ \$40. The outlook is very promising, and \$40 is likely to be an inside figure within the next three or four weeks.

Old Rails.—Prices are lower. Sales have been made at \$25 for a good many thousand tons, several lots to-day and yesterday at that figure, but the majority are for spring and summer shipment. Spot lots are held at about \$26, but there is no demand at present, lake deliveries having the preference at the wide difference in price.

Steel Rail Crops.—Sales at \$24.25, and from that to \$25.25, the last-named figure having been paid to-day for 500 tons prompt shipment to Philadelphia.

Scrap Iron.—A fair demand, but prices are in some instances a shade easier. Fish Plates have been in good demand, and sold this week at \$30.25 and \$30.50 for shipments to Philadelphia. Cargoes of No. 1 Scrap are held at \$24 @ \$24.25. For small lots we quote Wrought Scrap, tide-water delivery, \$25; Selected do., \$25.50 @ \$26; No. 2 do., \$15 @ \$16.50; Turnings, \$14 @ \$14.50; Old Car Wheels, \$17 @ \$17.50; Old Steel Rails, \$21.50 @ \$22.50; Cast Scrap, \$15 @ \$16; do. Turnings, \$10 @ \$10.50. Old Fish Plates, \$29 @ \$30.

Wrought Iron Pipe.—Considering the condition of the weather during the last week a large amount of business has been transacted. Everything in this department is sold up two months ahead, and mills are not disposed to contract for future deliveries until they can see their way clear with what they have on their books at present. Manufacturers anticipate a largely increased demand as soon as the season opens, and are confirmed in their anticipations by the number of inquiries received daily. Quoted prices are strictly adhered to. Discounts during the past week are as follows: Lap-Welded Black, 50¢; Lap-Welded Galvanized, 32 1/2¢; Butt-Welded Black, 35¢; Butt-Welded Galvanized, 25¢; Boiler Tubes, 42 1/2¢.

Nails.—A fair demand is reported. Price is firm and unchanged at \$2.50 from store, and which is apparently being well maintained.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., February 1, 1887.

The general Iron business remains much the same as noted a week ago. While there is not as much excitement as there was in December and the early part of January, there is no falling off in the volume of business. Furnaces and mills are all busy, some of them sold several months ahead, and the outlook for an active spring and summer trade was never better. There is nothing

new in labor circles, excepting that the river coal-miners, estimated in round numbers at 7000, are on a strike, having made a demand which the operators say they cannot in the present condition of affairs meet.

Pig Iron.—There is no falling off in demand, as compared with the past week or two, but there is not as much inquiry as there was last month, nor is it to be expected, in view of the large purchases then made, many consumers having covered their wants for from one to four months' ahead. There has been, and is still, a good deal of apprehension in regard to Foreign Iron, but, just as soon as it can be placed in American markets at a less price than American, there will be a halt called in the upward tendency of American Iron. With the exception of Bessemer, which has been advanced 25¢ @ 50¢ per ton the past week, prices remain unchanged; and it may be here added that at the advance Bessemer is not at all out of proportion with other grades of iron. While production is larger than ever before, the same is true of consumption, and the visible supply is considerably less than it was a year ago, and still being reduced. We quote prices as follows:

Neutral Gray Forge	\$30.50 @ \$31.25, 4 mos.
All Ore, Mill	\$1.50 @ \$2.00, 4 "
No. 1 Foundry	\$22.00 @ \$25.00, 4 "
No. 2 Foundry	\$21.00 @ \$21.50, 4 "
No. 3 Foundry	\$19.50 @ \$20.00, 4 "
Charcoal Foundry	\$21.50 @ \$25.00, 4 "
Cold-Blast Charcoal	\$27.00 @ \$30.00, 4 "
Bessemer Iron	\$22.50 @ \$30.00, 4 "

Included in the sales reported for the week were 5000 tons Bessemer at \$22 cash; 3000 do. do. at \$22.50, four months, and 1000 for March delivery at \$22.50 cash. Also 1000 tons Gray Forge at \$20.50 cash at furnace in Mahoning Valley.

Muck.—Continues in demand, and prices are firm, with some sales at a further advance. We can report sales of several thousand tons at \$36.50 @ \$37 cash for February, and \$37.25 @ \$37.50 cash for March. However, unless there is a further rise in the cost of Pig Iron Muck is not likely to go much, if any, higher. As compared with the lowest point, there has been an advance of \$10.50 @ \$11.50 per ton.

Manufactured Iron.—There is no material change in the position of the market since our report of a week ago. Orders continue to come forward freely; mills are all fully employed, and the outlook for a good spring trade never was better. Prices are firm, upon a basis of 2¢ for Bars, 60 days, 2¢ off for cash. It is probable that large contracts will be made for Skelp Iron this month, and it is expected that a number of mills will run almost exclusively on this character of iron, as was the case last year.

Nails.—There is an increasing demand, and prices are reported at the card rate, \$2.60, 60 days, 2¢ off for cash, with the usual rebate of 10¢ per keg on curls and upward. We are cognizant of offers having been refused at a slight reduction from the rates quoted; indeed, some manufacturers do not appear disposed to contract for future delivery at present prices, from which it is evident that they have no idea of a backward movement. It is intimated that a further advance at the next meeting of the Western Association is not improbable, and this no doubt has something to do with the anxiety of large buyers to make contracts at present prices. As stated in our report of last week, there are now no Iron Nails being made here, and but few west of the Mountains. It is very evident that Iron Nails will soon be a thing of the past; at the leading western points of distribution, Chicago, Milwaukee and St. Louis, there is scarcely any inquiry for Iron Nails, which have been almost entirely knocked out by Steel.

Wrought-Iron Pipe.—There is an increasing demand, and it will not be long until the mills will be as busy as they can be. The Pipe trade of 1886 was larger than ever before, but the indications are that it will be still larger this year, as the Pipe-making capacity has been increased by the starting up of new mills. Prices unchanged. Discount on Black Butt-Welded Pipe in carlots, 37 1/2¢; on Galvanized do., 27 1/2¢; Black Lap-Welded, 52 1/2¢; Galvanized do., 35¢; Boiler Tubes, 42 1/2¢; Casing, all sizes, 45¢; 2 Inch Tubing, 16¢ 7/8; 2-Inch Line-Pipe, 14¢; 8 Inch Drive-Pipe, \$1.40.

Steel Rails.—Heavy Sections are quoted at \$39.50 @ \$40 cash, on cars at mill in Pittsburgh. The last sale reported was at \$39.50 cash.

Blooms, Billets, &c.—In Bessemer, Billets and Blooms continue very scarce, and prices are firm at \$35 @ \$35.25 cash, with a small sale reported at the outside figure. Nail Slabs continue in demand and firmer; sales at \$35 cash, which is the ruling price with mills making them sold ahead. It is difficult to give reliable quotations on Crop and Bloom Ends in the absence of sales.

Old Rails.—There have been but few sales reported here for a couple of weeks, and it is evident that there is not as much inquiry. Owing to a prevailing impression that possibly prices have touched the highest notch, consumers are not as anxious to contract for future delivery as they were some time ago. We continue to quote Double Heads at \$29.50 @ \$30, and English Tees at \$28.50 @ \$29. There has been little or no demand for Old Steel Rails of late.

Steel.—Best brands of refined Cast Tool Steel, 8¢ @ 9¢; Bessemer and Open-Hearth do., 2 1/4¢ @ 3¢; Bessemer and Open-Hearth Flow Slabs, 3¢; Crucible Sheet Steel, 9¢.

Railway Track Supplies.—There is a continued good demand, and prices are steady as quoted: Spikes, 2.60¢, 30 days delivered; Splice Bars, 2¢ @ 2.10¢; Track Bolts, with Square Nuts, 3.20¢, with Hexagon do., 3.30¢.

Old Material.—There is a continued good demand, and prices are still tending upward, although there has been no important change during the past week. No. 1 Wrought Scrap, \$23 @ \$24, net ton; Wrought Turnings, \$17 @ \$18; Old Car Axles, \$28 @ \$29; Cast Borings, \$13 @ \$14, gross; Old Car Wheels, \$22 @ \$23; Open-Hearth Steel Scrap, \$23 @ \$24; Crucible Steel, \$26 @ \$27, gross tons.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, TENN., January 31, 1887.

Pig Iron.—There has not been during the past week the feverish excitement that prevailed some two or three weeks ago. Whether this indicates a break or not it is hard to tell, but it is certainly a fact that the wishes of the largest producers tend to a cessation of any further advance. The situation was rather laconically expressed a day or two since by a large producer in this sentence: "If the fool consumers would only be content buy just what they want to use from time to time, prices would not advance another cent." The trouble is that some consumers who at best cannot melt over 500 tons per month desire to contract for 1000 or 2000 tons per month, and if they cannot get it at one furnace try another and keep on trying, and at last get what they want by advancing the price \$1 or \$2 per ton. That furnace is tied up for that amount, or probably for their entire output, and the next buyer that comes along gets the reply: "Will not have a ton to sell under six months." This causes a demand for double the iron that is actually needed. Prices have been a little steadier during the week, and some round lots have been sold to foundries on a basis of \$21 for No. 1 and \$20 for No. 2. No. 3 Forge is being largely used by many of the large foundries, and some sales of choice have been made at \$19; 1000 tons of Nos. 3 and 4 to a mill were sold at \$18.50 on a basis of 60 days. These prices are f.o.b.

Miscellaneous.—An erroneous report has gone out upon the subject of the purchase of Bessemer Pig by the Roan Company. The facts are that, when they had fully decided to change their plant to Steel, they found their furnaces (they have three stacks under their control) so booked ahead on Foundry and Forge grades, that they could put only one on Bessemer, which was done. There was also an enormous amount of work to be done at the mines in getting ready to get out the ore. Railroads were to be built, prodigious quantities of rock had to be stripped from the face of the mountain to get at the ore. For the sake of economy, and in order to guard against any contingency, they purchased 4000 tons from England, and that is all there is in it. In less than two months the ore, which lies in an immense body will be stripped so that enough can be mined to supply a dozen furnaces, when another furnace will at once be turned on to it.

Cincinnati.

CINCINNATI, January 31, 1887.

Pig Iron.—For a day or two prior to, and for several days subsequent to, our review of the business in Pig Iron at this point, the indications were that the culmination in the advance of prices had come, or, at least, were near at hand. There was more iron offering and buyers were less urgent in their demands. Furnaces both old and new, more especially the latter, were disposed to sell or contract 40% to 50% of their probable output for the summer and fall months, while a few were searching for a full complement of orders covering their product close up to the new year. This urgency to sell future make at the present and comparatively high prices was marked under an ostensible policy to keep the market level, and prevent the importunities of buyers from advancing prices to such a point where they would totter and fall. This was plausible, and doubtless some furnaces acted in good faith. It is not the intention to include all stocks in this catalogue, probably it contains a minority, but they are such as are prominent upon the market, and have given an impression to current events. But we are treating of the past rather than of the present. During the past few days there has been a decided change in the temper of the market. Much, if not all, of the iron offering, and which hung fire for a few days, has been taken, relieving the market, which has asserted its claim to buoyancy, while buyers have not supplied their full wants apparently, yet prices, while strong, have not advanced. There are a few producers who profess to believe in a further material advance before any reaction of moment comes, and, in fact, such a view is a very tenable one in the light of recent developments. The large sales recently accomplished and the contracts offering lend support to such an opinion. A few dealers here are endeavoring to quench any excitement which may arise, discourage new sales, and prevent any further rise, and they have not been entirely unsuccessful in their efforts. The course of the market will doubtless be the resultant of these

opposing forces, and if any observer is mathematician enough or shrewd enough to figure it out he may prove himself another Newton of a business character. It only remains to give a list of some of the most important transactions in this market during the week to give a clearer idea of the drift of the market. One Southern company of two stocks have placed through their Cincinnati representatives 7000 tons of Mill and Foundry grades on a basis of \$21.50 for No. 2 Foundry and \$20.50 for No. 1 Mill, for delivery, commencing in March and extending into August and September. Another furnace has placed 4000 tons of similar grades on the same bases for delivery during the summer months; still another firm have sold 2000 tons No. 2 Foundry and 2000 tons No. 1 Mill at the same range of prices. One considerable amount of probably 5000 to 6000 tons of Southern Coke Iron, of a mixture of Bright, Gray and Silver Bright grades has been sold on about the same basis of the sales just given. In addition, there have been moderate sales of No. 1 Foundry at \$22.40 here. Sales of 50 and 100 ton lots of Lake Superior Iron have been sold to Cincinnati shops at \$26 @ \$27. Some large sales of Southern Car-Wheel are intimated at \$27 @ \$28, but no definite amounts are mentioned. Small lots of No. 2 Foundry, Low Moor, Va., are reported at \$21.50 @ \$22. The sale of 5000 tons Bessemer Iron, noted last week, was sold on a basis of \$24.25 per ton here, instead of \$23 as reported. The prices for Pig Iron now current here for cash are about as follows:

Charcoal Foundry.	
Hanging Rock, No. 1.....	\$34.50 @ \$35.00
Hanging Rock, No. 2.....	32.50 @ 33.00
Southern No. 1.....	23.00 @ 24.00
Southern No. 2.....	22.00 @ 23.00
Coal and Coke Foundry.	
Ohio Soft Stonecoal, No. 1.....	21.00 @ 22.00
Ohio Soft Stonecoal, No. 2.....	20.00 @ 21.00
Southern Coke, No. 1.....	21.00 @ 22.00
Southern Coke, No. 2.....	20.00 @ 21.00
Southern Coke, No. 3.....	20.00 @ 21.00
Ohio and West Pennsylvania Coke, No. 1.....	22.00 @ 23.00
Ohio and West Pennsylvania Coke, No. 2.....	20.50 @ 21.50
Forge.	
Strong Neutral Coke.....	30.00 @ 30.75
Mottled.....	19.00 @ 19.50
Southern Coke.....	19.50 @ 20.50
Car-Wheel and Malleable Irons.	
Southern Car-Wheel.....	27.00 @ 28.00
Hanging Rock, Cold Blast.....	27.00 @ 28.00
Hanging Rock, Warm Blast.....	24.50 @ 25.50
Lake Superior and Malleable.....	26.00 @ 27.00

Manufactured Iron.—A strong tone has prevailed for all kinds, with a fair volume of business. The mills are deterred from advancing prices by reason of the existing agreement with workers to pay wages on the sliding scale. We quote: Bar Iron, 2¢ @ 2.10¢; Charcoal Bar Iron, 3¢ @ 3.10¢; Sheet Iron, Boiled, Nos. 10 to 27, 2½¢ @ 3¼¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3¼¢ @ 4¼¢ per lb.

Scrap.—There has been a good demand and a light supply. Sales of Wrought Scrap have been made at \$1.20, and Cast Scrap at 70¢ @ 75¢ per ton. Rails have continued strong, with sales at \$28 @ \$30, but the outside rate is exceptional. Wheels have been a little easier, with offerings at \$21.50 @ \$22.

Nails.—Have been in fair demand, but easier in tone, with quoted jobbing prices shaded 5¢. Sales are made on the basis of \$2.65 @ \$2.70 per keg for Steel, and \$2.50 @ \$2.55 per keg for Iron, for 10d to 60d, and other sizes at proportionate rates.

Birmingham.

BIRMINGHAM, ALA., January 31, 1887.

Pig Iron.—For the first time in several months it may be said that there has not been the slightest advance of Pig Iron prices for two weeks, nor do manufacturers seem quite so confident of a continuance of the upward movement; but, it is only fair to say that this rather pleases them than otherwise, the sentiment being now almost unanimous that but for the general reactionary efforts on the market, a decline of \$1 would be better than an equal advance. Probably the heaviest selling of the last week has been done by the new Sloes management. They have placed some three months' output, mainly in the West, from which section the demand comes in—even more than its usual proportion—to the East. The Tennessee Coal, Iron and Railroad Company have some 6500 tons sold ahead for their two furnaces here and three in Tennessee. Prices are still irregular. Sales of IX on short time are reported from \$17.40 to \$18 at the furnace—the former price being probably nearer the average than the latter; while to different markets the same concern has sold one mill only 50 cents below this grade. At present every furnace is in blast. Woodward No. 2 was blown in on the 26th ult., being the tenth in the district. The second of the Eureka went in next day, as the other had a week earlier, both having been surprisingly little damaged by the "shut-down," forced by the unsuccessful strike of some six weeks ago.

Finished Iron.—In this line, in spite of the very heavy demand, prices do not seem to have been pushed beyond quotations of two weeks ago, at which figures the increased cost of materials is not more than reasonably covered. So far as the local trade is concerned the demand and the supply are so poorly balanced that the mill operators, as well as their customers, look with satisfaction upon the promises of other mills.

Nails.—Are up again a few cents, \$2.90 and \$2.65 being current quotations for the Steel and Iron articles respectively, laid down here in carlots. The difficulty of getting quotations cut for large orders and all other signs indicate a further advance.

Cast Pipe.—Can be had here in small quantities at \$35 @ \$38, the maker having constantly declined to sell ahead of production.

Louisville.

LOUISVILLE, KY., January 31, 1887.

Pig Iron.—The market for the week opened strong, with large sales at outside figures. The demand during the latter part has been less active, sales smaller, and a disposition to sell at inside figures on the part of some furnaces. As a general thing, however, sales made are at full figures. Other furnaces that are sold ahead and do not desire to book further orders are nevertheless holding their prices at an average of the inside and outside figures, and announce that they do not intend to advance, but will book orders at these prices to the extent of their capacity. The general feeling on the part of producers is against any further advance, and if it comes at this time it will be the fault of the buyers themselves. Producers realize that if prices are run up to extreme figures during the present season it will have a tendency to shorten the period of good prices, whereas if they can be held in check now, it will probably result in good prices for a year or two to come. The scarcity of iron for immediate delivery still continues, particularly for No. 2 mill and No. 2 Foundry, and the majority of furnaces are behind in their contracts for these grades. We quote for cash in round lots as below:

Pig Iron.	
Southern Coke, No. 1 Foundry.....	\$22.00 @ \$22.50
" " No. 2.....	21.00 @ 21.50
" " No. 2½.....	20.50 @ 21.00
Hanging Rock Coke, No. 1 Foundry.....	22.00 @ 22.50
Southern Charcoal, No. 1 Foundry.....	22.00 @ 23.00
Silver Gray, different grades.....	20.50 @ 21.00
Southern Coke, No. 1 Mill Neutral.....	20.00 @ 20.50
" " No. 2.....	19.50 @ 20.00
" " No. 1 Cold Short.....	19.50 @ 20.00
" " Charcoal, No. 1 Mill.....	21.00 @ 21.50
White and Mottled, different grades.....	18.00 @ 19.00
Southern Car-Wheel, standard brands.....	27.00 @ 28.00
Southern Car-Wheel, other brands.....	25.00 @ 26.00
Hanging Rock, Cold-Blast.....	27.00 @ 28.00
" " Warm-Blast.....	23.00 @ 24.00

Old Material.—The market for Old Material has been fair during the last week. The demand for Old Rails is still greater than for any other kind of Scrap. The prices are as quoted below:

Old Rails, ½ ton.....	\$27.00 @ \$28.00
Old Wheels, ½ ton.....	21.00 @ 22.50
No. 1 Country Wrought.....	20.00 @ ..
No. 2 Country Wrought, ½ 100.....	.70 @ .80
Boilers, cut, ½ 100.....	.60 @ ..
Boilers, uncut, ½ 100.....	.40 @ ..
Flues, Tanks and Sheets, ½ 100.....	.35 @ .50
Axles.....	1.35 @ ..

W. B. BELKNAP & Co., Louisville, Ky., report as follows, under date of January 31: The market is running along smoothly, holding its own with creditable persistency. The temperate articles of The Iron Age, with the statistics shown there, we think, have had a good deal to do with staying the speculative spirit that threatened to run riot and precipitate the inevitable consequences of over importation. The demand is unquestionably large and healthy, but it would be unfortunate to stimulate purchases further than for legitimate requirements. The Nail men are talking another advance, with very little to justify it, we fancy, except the argument that to parallel the other advances in iron they should have so much more per keg for Nails. The most distracting feature of advances is the change in complicated lists, several of which have recently taken place, such as of Locks and Screws. They are particularly depressing to those who are in the throes of catalogue-making, since the lists thus become obsolete before the completed book issues from the printer's hands. The varying factors of material and labor may throw the relative cost of different sizes a little out of gear, but we believe it would be better to suffer that than to be constantly changing well-established lists.

Bar Iron.—Is perhaps the strongest article we have to note. Late advances have found ready acceptance in the market, and buying is just as free as before. There is a wide discrepancy of price between manufacturers, according, we take it, as they have old stocks or full order books, or specially favored locations.

Hoops and Bands.—Are moving rather better, but their advances have not been commensurate with those of Bar Iron.

Sheet Iron.—Is very strong and the lighter gauges have been marked up again \$1 to \$2 per ton.

Steel.—The demand for Plow Shapes and Patterns is growing stronger, although the trade is extremely late on these and Plow goods generally this year.

Nails.—There has been an active demand for Nails, and inquiries are largely for carload lots. Purchases have been evidently deferred, as the last advance took every one by surprise. The difference between Steel and Iron Nails has been greatly widened, preference running largely for Steel.

Wire Nails.—Having advanced correspondingly, are about maintaining their proper relation with their more plebeian brethren.

Wire.—Is exceptionally strong both for Plain and Barb. The demand is large and promises to grow still larger, but the new prices do not deter the buyer from taking hold freely.

Files and some other miscellaneous goods have been marked up some 5 to 10%. The only extraordinary feature of the situation is that a number of articles outside of Iron and Steel have not been affected by the market, as seems proper they should. It used to be said that iron was the gauge of prices, and affected everything in the commercial world, but many products are lagging behind and give our friend, the farmer, a chance to grumble.

Cleveland.

CLEVELAND, January 31, 1887.

Iron Ore.—Vessels have been chartered during the week for the transportation of Ore to Lake Erie ports at the schedule which mine owners have been willing to pay from the beginning of the agitation over rates—viz., \$1.40 from Escanaba, and \$1.60 from Marquette. The large vessel owners claim that the charters are limited, and insist on \$1.50 from the former port, and \$1.75 from the latter. Mine owners, dealers and furnacemen consider these rates too high, and will hesitate a long time before consenting to them. Vessel men are now intimating that more than \$2 per ton will be asked for bringing Ore from Ashland. The Oremen are not crowding matters, and are confident that the Ashland rate will not exceed the figure named. This controversy over transportation prices is the most interesting feature of the market, inasmuch as the question involves the handling of not less than 4,000,000 tons of Ore. Heavy producers say boldly that they will not submit to the demands of the vessel owners. Furnacemen assert that the prices they have agreed to pay for Ore do not warrant such exorbitant carrying rates, and say that \$1.25 from Escanaba, \$1.40 from Marquette and \$1.65 from Ashland would be a fair scale of prices. The only concessions thus far have come from the vessel men. Two weeks ago it was claimed that no lake vessel would carry ore from Escanaba for less than \$1.50 per ton. Charters have been made for \$1.40, and more vessels have been offered at the same price. There seems to be every reason for repeating the prophecy made two or three weeks ago that a compromise of from \$1.35 to \$1.40 from Escanaba, \$1.60 to \$1.65 from Marquette, and \$1.85 to \$1.90 from Ashland will be agreed upon before the actual shipments begin. The market has been quiet during the past week. Numerous small sales were quietly consummated, and a number of large orders were placed, but all within the quotations given last week. Desirable Ores are being offered in quantities to suit the purchaser. Advances are quoted only on such Ores as are practically out of the market. The best grades of Hematites are quoted at \$6 per ton, and those a grade or two lower at \$5.50 @ \$5.75. Non-Bessemer Ores containing over 60% of iron are selling at \$5.25 @ \$5.50; other non-Bessemer at \$4.75 @ \$5. Several important sales are pending, the consummation of which will go far toward permanently establishing the market for the coming season, inasmuch as several hundred thousand tons are involved.

Pig Iron.—The market has been more quiet the past week than at any time for two months. There seems to be a temporary check on the upward tendency which has continued uninterruptedly for five or six weeks. The generally expressed hope is that prices will go no higher but remain at present quotations. There is certainly more iron in the market than for some time, and orders are more quickly filled. There are, however, no indications of any great weakening in the market, and there seems no fear of a revival of the inactivity which characterized the Pig Iron trade a month ago. The opinion seems quite general that the upward limit has been reached, and that prices will remain stationary for some time to come.

Scrap Iron.—Old Rails are quoted at \$29, and the sale of a small lot at \$29.50 is reported. Old Wheels are held at \$21.50 cash. There is a moderate demand for all grades of Scrap.

Detroit.

CHARLES HEMROD & Co., dealers in Pig Iron, Detroit, Mich., report, under date of January 31, 1887, as follows: There has been little or no change in the market since our last report. Several inquiries for large amounts have been received, and all sales that have been made have been at full prices. While there has not been quite as much activity as was shown a few weeks ago, yet consumers are willing to pay current prices when they can obtain the brand of iron they desire. On account of the unsettled condition of freight-rates, some furnaces decline to make contracts for future delivery unless the consumers will agree to pay any advances over the present rates. Manufacturers do not want to force prices any higher and are not pressing consumers to place their orders. We quote the market as firm about as follows:

Lake Superior Charcoal, all numbers.	
Lake Superior Coke, All Ore.....	\$25.00 @ \$26.00
Lake Superior Coke, Cinder Mixed.....	23.50 @ 24.50
Standard Ohio Blackbands.....	23.50 @ 24.50
Southern No. 2.....	22.50 @ 23.00
Southern No. 1.....	21.00 @ 22.00
Jackson County, Ohio, Silvery.....	22.00 @ 23.00
American Old Iron Rails.....	25.00 @ 26.00
Old Wheels.....	22.00 @ 23.00

St. Louis.

ROGERS, BROWN & Co., St. Louis, W. H. SHIELDS, manager, report as follows, under date of January 31, 1887: We record a firm and fairly active market. Sales have been as liberal as the light supply of iron would permit, mainly, however, of Southern brands for deliveries beginning about May and June, running through the rest of the year. This forward selling is confined almost entirely to Southern producers, who consider present prices fairly remunerative, and wish to hold them where they are. Prices could readily be forced higher, but such action is deprecated as likely to bring about a reaction through large importations, which are impossible on the present basis. The Soft Ohio and Ken-

ucky American Scotch brands have been in special request, but difficult to obtain. Missouri Charcoal Irons are not figuring much in the general market, as their product is largely absorbed in special channels. We quote prices f.o.b. cars St. Louis as below:

Charcoal Foundry.	
Missouri.....	\$21.00 @ \$22.00
Southern.....	22.00 @ 24.00
Coal and Coke Foundry.	
Southern, No. 1.....	22.50 @ 23.50
Southern, No. 2.....	22.00 @ 22.50
Ohio Softeners.....	21.50 @ 22.50
Mill Iron.	
Missouri.....	21.00 @ 21.50
Southern, No. 1.....	21.00 @ 21.50
Southern, No. 2.....	20.50 @ 21.00
Car-Wheel and Malleable Irons.	
Southern.....	23.00 @ 24.00
Lake Superior.....	25.00 @ 27.00
Scrap, etc.	
Old Car Wheels.....	10.00 @ 20.00
Old Rails.....	25.00 @ 27.00
Connellsville Coke (Frick's).....	5.85 @ ..

Imports.

The following were the Imports of Hardware, Iron, Steel and Metals into the Port of New York for the week ending February 2, 1887:

Hardware.	
Baldwin Bros. & Co., Fish plates, pieces, 55,660	
Gun barrels, cs., 4	
Mdse., cs., 11	
Bloomfield J. C. & Co., Old rails, pcs., 11,784	
Mach'y, pkgs., 16	
Baker, Hermann & Co., Wire rods, coils, 432	
Mdse., cs., 25	
Brown Bros. & Co., Scrap, tons, 301½	
Cases, 13	
De La Vergne Refrig. Co., Pig, tons, 850	
Cylinders, 2	
Field, Alfred & Co., Old rods, 338	
Packages, 5	
Anvils, 25	
Gorgoz's Sons, Old rails, tons, 250	
Mach'y, pkgs., 1	
Hartley & Graham, Spigels, tons, 572	
Mdse., cs., 2	
Kantor, A., Co., Rails, 702	
Mdse., cs., 3	
King, Ezekiah, Rings, bdls., 27	
Mdse., cs., 5	
Pa. R. R. Co., Ore, tons, 730	
Mach'y, cs., 11	
Schoverling, A., Bundles, 333	
Mdse., cs., 9	
Schoverling, Daly & Co., Steel, 11	
Gales, Cases, 14	
Sellers W. B., Baring Bros. & Co., Bars, 2156	
Mdse., cs., 2	
Waklin, Adolf, Rods, pkgs., 3947	
Mach'y, cs., 45	
Wells, Fargo & Co., Bundles, 161	
Mach'y, pkgs., 21	
Wiebusch & Hilger, Wire, cs., 12	
Mdse., cs., 29	
Cases, 6	
Iron.	
Abbott, Jere & Co., Drexel, Morgan & Co., Spigels, tons, 299½	
Baring Bros. & Co., Rods, bdls., 492	
Rivet rods, coils, 407	
Bars, 2590	
Wire rods, coils, 445	
Besse wire rods, 1043	
Ore, tons, 240	
Brown Bros. & Co., Bundles, 67	
Bars, 2841	
Wire rods, bdls., 663	
Coddington T. B. & Co., Bundles, 339	
Crocker Bros., Spigels, cs., 148	
Spigels, tons, 170	
Pig, tons, 100	
Dunning, R. F. & Co., Girders, 144	
International Co., Scrap, tons, 175	
Lundberg, Gust., Bars, 4660	
Bundles, 70	
Naylor & Co., Rivet rods, coils, 216	
Spigels, tons, 50	
Stetson, Geo. W. & Co., Old rails, tons, 755	
Pig, tons, 100	

The imports at this port of Cutlery, Hardware and Metals during the week ending January 28 were as follows:

	Quantity.	Value.
Anvils.....	149	\$767
Brass goods.....	17	1,858
Chains and anchors.....	2	53
Copper.....	2	15
Clocks.....	27	1,262
Cutlery.....	98	28,392
Dutch metal.....	3	298
Guns.....	2	45
Hardware.....	13	468
Iron, pig, tons.....	330	2,153
Iron, sheet, tons.....	29	2,250
Iron, spigels, tons.....	1,116	21,239
Iron tubes.....	521	526
Iron, other, tons.....	1,917	31,908
Lead, pkgs.....	63	370
Machinery.....	168	12,989
Metal goods.....	329	3,413
Needles.....	9	2,174
Nickel, heavy.....	22	4,634
Old metal.....	22	5,322
Pins.....	9	475
Plumbago.....	1,417	15,267
Quicksilver.....	430	14,919
Railroad bars.....	2,155	9,961
Saddlery.....	11	1,867
Steel.....	30,107	36,905
Tin, bxs.....	2,714	10,089
Tin, slabs, 4,419.....	446,265	67,312
Wire.....	30	3,254
Zinc, oxide.....	350	3,146

Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper.....	80.00
Light Copper.....	70.75
Copper bottoms.....	70.75
Brass, Heavy.....	70.75
Brass, Light.....	60.00
Composition.....	60.00
Lead, Heavy.....	80.00
Tea Lead.....	80.00
Zinc.....	18.00
Wrought Iron.....	9.00
Light Iron.....	9.00
Stove Plate Iron.....	11.00
Machinery Iron.....	14.00
Grate Bars.....	7.00

Trade Report.

General Hardware.

The amount of business transacted during the past month is generally referred to as very satisfactory, and the demand continues steady, and represents a healthful activity. Business has been unusually active in lines which have been regarded as especially desirable purchases on account of their advancing tendency, but there has also been a demand, good for the season, from the trade generally, for other goods. As noted below, some further advances have taken place, besides which there has been on some lines a gradual stiffening in price, which is indicated by the withdrawal of extreme quotations, and the increasing disposition on the part of manufacturers to refrain from urging the purchase of their goods.

NAILS.

The New York market is only moderately active, with the manufacturers generally holding firmly, and selling at \$2.40 for carload lots of Iron Nails on dock. We hear, however, of some offers of small lots from several hands at concessions. It is urged that manufacturers, even at present prices, can do better by selling a part or the whole of their product as Muck Bar.

BARB WIRE.

The New York market is quite active at 4 1/4¢ for carload lots of Four-Point Galvanized Barb Wire for February and early March shipment. Since this is relatively lower than prices asked in the West, it is likely that those in the East may advance to parity with that section within a week or two.

In view of the advance in Plain Wire it was agreed to establish for the present a uniform price of 3 1/2 cents per pound for Painted and 4 1/4 cents for Galvanized Barb Wire, with 1/2 cent off to jobbers. On February 8 a meeting of the Board of Directors will be held at Chicago to consider matters of routine which are to be settled, and it is probable that a further advance in prices will then be ordered. The regular election of officers resulted in the choice of the following list: N. O. Nelson, of St. Louis, president; E. J. Marsh, of Chicago, vice president; F. B. Lawrence, of Chicago, secretary, treasurer and general manager.

A meeting of the United Wire Company, composing all the Barb Wire manufacturers of the United States, was held at the Tremont House, Chicago, on the 25th and 26th of January. The following is a complete list of these manufacturers:

Illinois.

Lyman Mfg. Company, Chicago.
Superior Barb Wire Company, DeKalb.
Northwestern Barb Wire Co., Sterling.
Frontress Barb Wire Co., East Dubuque.
Lambert & Bishop Wire Fence Co., Joliet.
Sandwich Enterprise Company, Sandwich.
H. E. Schnabel, Chicago.
Arthur H. Dale, Leland.
J. L. Elkwood, DeKalb.
Norton & DeWitt, Lockport.
Jacob Haisch, DeKalb.
Stiles and Calkins, Chicago.
Shreffler & Van Fleet, Joliet.
Munson Mfg. Company, Lee.
Lockport Wire Fence Company, Lockport.
Rock Falls Barb Wire Co., Rock Falls.
Peter P. Hill, Rochelle.
Dillman & Knowlton Mfg. Co., Joliet.
Mutual Mfg. Company, Chicago.
Crandall Mfg. Company, Chicago.
Chicago Galvanized Wire Fence Company, Chicago.
Lock Stitch Fence Company, Joliet.
Wm. Watkins, Joliet.
W. J. Adams, Joliet.
Ashley Wire Company, Joliet.
Illinois Wire Fence Company, Joliet.
Joliet Barb Wire Company, Joliet.

Iowa.

Iowa Barb Steel Wire Co., Marshalltown.
Hawkeye Steel Barb Fence Company, Burlington.
Cedar Rapids Barb Wire Co., Cedar Rapids.
Merchants' Union Barb Wire Company, Des Moines.
Vaughan Barb Wire Co., Des Moines.
Baker Wire Company, Des Moines.
Globe Barb Wire Company, Manchester.

Wisconsin.

Janesville Barb Wire Co., Janesville.
Ohio.
Ohio Steel Barb Fence Co., Cleveland.
Cincinnati Barb Wire Fence Company, Cincinnati.
Cleveland Barb Fence Co., Cleveland.

Kansas.

Southwestern Barb Wire Co., Lawrence.
Consolidated Barb Wire Co., Lawrence.

Nebraska.

Omaha Barb Wire Company, Omaha.

California.

California Wire Works, San Francisco.

Indiana.

Indiana Wire Fence Co., Crawfordsville.
Missouri.
Western Union Wire Company, St. Louis.
Southern Wire Company, St. Louis.
Kansas City Barb Wire Co., Kansas City.
American Barb Wire Co., St. Louis.

New York.

Buffalo Barb Wire Company, Buffalo.

Pennsylvania.

H. B. Scott & Co., Limited, Pittsburgh.
Iowa Barb Wire Company, Easton.

The Washburn & Moen Mfg. Company, of Worcester, Mass., co-operate with the

manufacturers named. The Gautier Steel Department of Cambria Iron Company, of Johnstown, Pa., is the only other Barb Wire manufacturer in the country, but it makes a specialty which differs from the Wire made by the regular Barb Wire establishments.

The object of this meeting of the United Wire Company was to complete arrangements for the formation of a plan to overcome the ruinous competition for trade which has demoralized business in this line for the past few years. Negotiations to this end have been in progress for a long time, but various obstacles have hitherto prevented the adoption of a plan. This meeting seems to have come nearer the settlement of the trouble than any which has yet been held. It was the largest, the most harmonious and the most business-like in the estimation of those who have been most active in endeavoring to establish a uniform course in the trade.

The plan which meets with most favor is one providing for an allotment of tonnage for the coming year to each manufacturer, based on the percentage of the aggregate production of all the works which he turned out in the past two years. For the coming year the production to be thus allotted will probably be fixed on a basis of 150,000 tons. If it is found in the course of the year that the demand will exceed this quantity an additional allotment will be made. The management of this delicate part of the business has been intrusted to Mr. F. B. Lawrence, of Chicago, who has had much experience in a similar line in other branches of manufacture. An arrangement has also been made with the Smooth Fence Wire Association, under which the production of Smooth Wire and of Barb Wire will be made to harmonize with each other, so as to guard against over-production.

As far as possible every effort has been made to secure the success of this plan. Much will of course depend upon the good faith of the individual manufacturers. It is asserted that already 97 per cent. of the total tonnage of the country has been pledged to support the movement, and it is believed that the remaining 3 per cent. will soon be brought into line. The manufacturers present at the meeting reported the prospect for the spring demand pointing to a larger trade than that of last year, and stocks in makers' hands are small, both of raw material and finished product. It is further stated that scarcely a mill making Smooth Wire is able to fulfill its contracts, great difficulty being experienced by Barb Wire manufacturers in getting Wire delivered at the time agreed upon.

MISCELLANEOUS PRICES.

F. A. Reither, Chicago, Ill., issues a new catalogue and price list of his Transom Lifters, which besides the description of the goods, gives revised list prices, the discounts being as follows: Bronzed Iron Rods, 50 per cent.; Brass, real Bronze or Nickel Plated, 40 per cent., with a discount of 2 per cent. for cash in 10 days, and an extra discount of 10 per cent. on all orders of 100 Lifters in a case. It is also intimated that special inducements are given on larger orders. The pamphlet devoted to these Lifters calls attention to the self-locking device, and alludes to its advantages. The following list prices of some of the leading Bronzed Iron goods will be of interest, the discount being as stated above, 50 per cent., and an additional 2 per cent. for cash:

No. 81, 1/4 inch x 3 feet..... 35 cents
No. 91, 1/4 inch x 3 feet..... 70 cents
Nos. 101 and 101 1/2, 1/4 inch x 3 feet..... 65 cents
Nos. 301 and 301 1/2, 1/4 inch x 3 feet..... 75 cents
Nos. 301 and 301 1/2, 1/4 inch x 3 feet..... 90 cents

The following is the revised discount sheet of the Covert Mfg. Company, West Troy, N. Y.:

Pages.	Disc't per cent.
5, Loop Harness Snaps.....	50
7, "New" R. E. Harness Snaps.....	50
8, Martingale Loop Snaps.....	50
9, Snap and Thimble.....	60
10, "New" Snap and Thimble.....	60
11, Round Eye Swivel Snaps.....	60
12, Loop Swivel Snaps.....	60
13, Heavy 1-inch Swivel Snap.....	60
14, "Giant" Open Eye Snaps.....	35
15, Open Eye Snaps.....	35
16, "New" Open Eye Snaps.....	35
17, Strap Eyes.....	50
18, Round Eye Snaps.....	60
19, No. 89 Round Eye Snaps.....	50
20, Combined Bit and Snaps.....	60
21, Leather Horse Tie.....	35
22, Web Horse Tie.....	60
23, Horse Ties, Snap and Thimble (Jute).....	60
24, Horse Ties, Snap and Thimble (Hemp).....	50
25, Horse Tie, "New" Snap and Thimble.....	60
26, Cattle Ties, Snap and Thimble (Jute).....	60
27, Cattle Ties, Snap and Thimble (Hemp).....	50
28, Cattle Tie, "New" Snap and Thimble.....	60
29, Lariat Tether.....	50
30, Picket Pins.....	50
31, Horse Tie, O. K. (Jute).....	60
32, Cattle Tie, O. K. (Jute).....	60
33, Web Halter.....	50
34, Rope Halter, 1/4 inch (Jute).....	40
35, Rope Halter, 1/2 inch (Hemp).....	60
36, Rope Halter, 3/4 inch (Jute).....	60
37, Halter Leads (Jute).....	50
38, Halter Leads (Hemp).....	50
39, Gentlemen's Hitching Cord.....	35
40, Weight Cord.....	35
41, Hitching Weight.....	50
42, Driving Reins.....	40
43, Hammock Ropes.....	35
44, Bull Lea Ja.....	35
45, Bull Soap.....	35
46, Soldering Irons.....	35
47, Soldering Coppers.....	30
48, Bristle Card.....	35
49, Breast Chain, Short Snaps.....	50
50, Lengthening Snaps.....	35
51, Open Eye Breast Chain Snap.....	35
52, Breast Chain, Long Snap.....	60
53, Post Chain.....	60
54, Breast Chain, New Patent.....	50
55, Center Breast Chain Snap.....	35
56, Stallion Chain.....	35
57, Cart Breach End Irons.....	30
58, Cart Breaching Chains.....	30
59, Halter Chain.....	50
60, Rein Chain.....	60
61, Reel Chains.....	40
62, Chain Cow Tie.....	35

ments which are permitted are not made so generally as to give irregularity to the general price of the goods.

The market for Coil, Trace, and Fancy Chains continues very firm, and recent advances have been made in these goods.

The File Market is characterized by some irregularity, some of the manufacturers withdrawing their extreme quotations, while as low quotations as before are still being made. The tendency in Tacks is still toward better prices. The goods cannot now be purchased at the extreme figures which were a little while ago within the reach of buyers. The manufacturers have not as yet taken any concerted action with reference to uniform base discounts, but there are indications that before long it may be feasible to do so.

The market for Tinware, Stamped, Pieced and Japaned, is firmer than it has been. The extreme net prices which have heretofore been made have been quite generally withdrawn or advanced, and the manufacturers are approaching more closely to the regular discounts.

The market for Padlocks is decidedly firmer than it has been, and manufacturers have withdrawn their extreme quotations, at which, however, large purchases have been made by the trade, who recognized that the goods were exceedingly low and likely to advance. The discount to the regular trade is 70 per cent. with the usual 2 per cent. additional for cash within 30 days. In the present condition of the market it is not unlikely that the goods can be purchased on more favorable terms from the jobbers than from the manufacturers.

David Maydole & Co., Norwich, N. Y., issue a circular advising the trade that no change has recently been made either in their price list or discounts, and that they do not contemplate making any change. The action recently taken by other Hammer manufacturers in this direction, and the report which was current to a certain extent that David Maydole & Co., had adopted the new list, is the reason for this explicit announcement.

The American Screw Company, Providence, R. I., besides their discount sheet, January 27, announcing the revised prices of Screws at 10 issues one, February 1, in which Coach Screws are quoted at discount 66 2/3 per cent., instead of 70 per cent., as heretofore.

Shepard Hardware Company, Buffalo, N. Y., have recently advanced their prices on all Blind Hinges, and are at present quoting the Champion and Steamboat Gravity at the same price as the Buffalo and Niagara. It will be remembered that the two former patterns have heretofore been sold at lower prices than the latter.

Revised discounts are issued by J. B. Savage, Southington, Conn., giving the new prices on the line of Carriage Hardware, of which he is manufacturer.

Most of the manufacturers of Common Tire Bolts are voting advanced prices, but the American Screw Company, Providence, R. I., still print discount 70 per cent.

No change was made by the manufacturers of Chisels and Drawing Knives at their recent meeting. Prices were referred to as well sustained, and an advance was considered inadvisable.

Owing in part to the delay of the manufacturers in issuing the revised list prices on Locks, many of the jobbers are still selling from the old list and at former discounts. There are, however, indications of a disposition to hold Locks at higher prices, even by the houses who have a considerable stock purchased before the advance. On the part of the manufacturers the new prices are firmly maintained, and the special arrange-

IRON WOOD SCREWS.

Revised List, Adopted January 27, 1887.

Nos.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	20	22	24	26	28	30
Inches.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
1/4	40	40	40	40	40	41	41	42	44	46	52	56	61	66	71	78	85	93							
3/8	40	40	40	40	41	41	42	44	46	48	52	56	61	66	71	78	85	93							
1/2	40	40	40	40	41	42	44	46	48	50	52	56	61	66	71	78	85	93							
5/8	40	40	40	41	42	44	46	48	50	52	56	61	66	71	78	85	93	101							
3/4	41	42	44	46	48	50	52	54	57	61	65	71	78	86	95	104	113	122	135	153					
1		45	48	50	52	54	57	61	65	71	78	86	95	104	113	122	135	153	181	203	230	261	281		
1 1/4		57	59	61	63	66	70	75	82	90	99	109	120	130	140	150	160	170	180	190	200	210	220		
1 1/2		67	69	71	73	76	80	86	94	102	110	119	128	138	148	158	168	178	188	198	208	218	228		
2			91	93	98	102	109	118	128	141	154	169	187	205	230	261	303	346							
2 1/4					116	119	123	131	142	155	169	189	207	232	259	281	323	362	415						
2 1/2					134	137	141	147	159	172	188	207	232	259	281	323	362	415	477						
3						215	218	222	226	238	262	283	305	329	382	433	506	623							
3 1/2							294	297	300	304	310	322	339	361	386	440	500	579	688						
4								380		385		395	417	444	500	570	664	763							
4 1/2									498					515	576	664	765	876							
5										641	675	775	876	998	1205										
6											1012	1022	1070	1210	1301	1520									

BRASS WOOD SCREWS.

Nos.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	20	22	24	26
Inches.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
1/4	52	52	55	57	60																		
3/8	52	53	56	58	62	67	71	78															
1/2	56	58	61	67	71	79	86	98	109	123	140	156	175										
5/8	59	64	70	78	86	96	109	123	140	156	175												
3/4	70	72	74	83	93	104	122	138	157	175	197	218	243	268	296								
1	90	92	95	98	101	116	135	153	173	195	218	242	269	298	329								
1 1/4	101	104	107	110	127	148	168	191	214	240	267	297	328	362	435								
1 1/2	135	138	141	144	147	173	197	213	252	283	316	351	388	429	471	516	612						
1 3/4	186	189	192	195	198	226	258	292	328	367	408	452	500	549	601	713							
2	245	248	251	254	291	330	372	417	464	517	568	625	684	813	953	1107							
2 1/4	314	317	320	323	326	370	418	468	521	578	638	701	769	912	1070	1242							
2 1/2	450	454	457	460	463	519	578	642	707	779	853	1012	1187										
3	623	626	629	632	635	704	778	855	938	1113	1304	1512											
3 1/2	900	902	905	908	911	914	917	1105	1312	1537	1782	2047											

Advances have also been made by the Sadlery Hardware manufacturers to cover the increased cost of raw material and labor.

ITEMS.

The death of Benjamin F. Libbey, well known from his influential position and long connection with the manufacture of Locks, took place last Saturday at his residence in this city, at the age of 67, after an illness of several weeks, during which time little hope was entertained of his recovery. The funeral was attended on Monday, and among those present to manifest their respect to his memory were many representatives of the Hardware trade. Mr. Libbey for more than 30 years was connected with the Norwalk Lock Company, of which for many years he has been president, and to whose success he very largely contributed. He had also wide acquaintance in the trade, and has been prominently identified with

on by Arthur B. Chapin and Harry C. Crawford, under the same firm name, the management continuing as before, Mr. Mundy remaining with the firm.

The Norwalk Lock Company, South Norwalk, Conn., and 82 Chambers street, New York, issue a revised list of Door Locks, Knobs, &c., in convenient form. It is intended to be attached to their No. 3 Price List.

The wholesale Hardware and Cutlery store of the Wells & Nellegar Company, Nos. 72, 74 and 76 Lake street, Chicago, was entered by a burglar on the night of the 24th of January. Although he left unmistakable evidences of his visit, the members of the company report their loss very trifling in amount, notwithstanding the sensational reports published in the daily papers.

Edward Dinkenspiels has become a member of the firm of the Hecht Novelty Mfg. Company, the firm name remaining the same as heretofore.

North Bros., Philadelphia, have transferred their business to the North Bros. Mfg. Company, which will be conducted the same as the former firm.

The circular of the Troy Nickel Works, Troy, N. Y., illustrates the line of goods which they are making, including Fire Sets, Fire Shovels, Pokers, and Sove Lid Lifters, some of which are illustrated in their advertisement on page 34. Their agents, J. & C. Sherwood, of Nyack, N. Y., are presenting these goods to the merchants in the West. The company also coil wire in any desired shape, and have machinery of their own patenting which is especially adapted to this work.

* Attention is called to the advertisement on page 13 in which the Francis T. Witte Hardware Company, 106 Chambers street, New York, illustrates one of H. & J. W. King's Razors, their No. 823, which is quoted at \$18 net, per dozen.

Announcement is made that the co partnership heretofore existing between Joseph F. Curren and Fred. A. Baggs, under the firm name of Curren & Baggs, doing business at 106 Chambers street, New York, has been dissolved by mutual consent. Mr. Curren, who will settle the affairs of the firm, will continue the business at the same place in his own name.

We call the attention of our readers to the advertisement on page 16 of H. L. Green & Co., representing manufacturers of a general line of Iron and Steel and Nails, with Western office at No. 46 Lake street, Chicago.

It is scarcely necessary to invite the attention of our readers to the unique announcement in regard to their manufactures, which is made on page 24, by the A. F. Pike Mfg. Company, Pike Station, N. H.

The T. F. Cheriton Hardware Company, 122 Chambers street, New York, are manufacturing Cheriton's Common Sense Hat and Coat Hooks, and allude to the advantages possessed by it, referring especially to its durability and strength and the saving of screws in its use, as one screw is enough for each Hook.

A change has been made in the membership of the Perkins Mfg. Company, New Haven, Conn., Henry L. Bradley, formerly of F. S. Bradley & Co., New Haven, having been admitted into the firm, the style of which becomes the Perkins & Bradley Mfg. Company. They advise us that they have nearly doubled their facilities. In addition to the Hooks and Garment Hangers which they have heretofore been making, and which they allude to as meeting with a satisfactory response from the trade, they are increasing their line with specialties which will be represented in a catalogue soon to be issued. Their announcement in regard to the goods which they are offering is made on page 42.

As referring to a seasonable line of goods, our readers will notice the effective advertisement on page 39, in which E. C. Stearns & Co., Syracuse, N. Y., illustrate their Stuart's Window Screen Frame, and call attention to some of the advantages which are claimed for it.

Our readers will observe the half page advertisement on page 47, in which the Henry Seymour Cutlery Company, Holyoke, Mass., call attention to their varied line, with illustrations of some goods to which they call special attention at this time.

In addition to the Thill Spring manufactured by Stiles Frost, Boston, shown on page 42, and well known to the trade, it is intimated that he will put on the market before long the Kemper Rowing Tricycle, an entirely new machine, to which we have made previous reference.

Our readers will observe the advertisement of Haydock & Bisell, on page 27, in which they give particulars in regard to their auction sale on February 9, 10 and 11, of Table and Pocket Cutlery. The goods then to be sold are the remaining stock of finished goods of the Bridgeport Knife Company, and are offered by the order of C. S. Landers, trustee.

WILLIAM H. H. PORTER.

We regret to have to announce the death of William H. H. Porter, junior partner of the firm of Frye, Phipps & Co., Boston, Mass. The appreciation in which he was held is evidenced by the following resolutions which were passed at a meeting of the Hardware trade of Boston, which was called to take action with reference to his death. They were presented by a committee consisting of O. D. Dana, C. F. Dowse, C. H. Bolles, Henry Brooks and A. T. Young:

The Hardware Trade, desirous of expressing their appreciation of their late associate, would respectfully submit the following resolutions: The death of Mr. Wm. H. H. Porter in his early manhood removes from useful activity a man of generous performance and liberal promise. His character was pronounced, and built on the firm foundation of integrity and honor. His usefulness was limited only by his opportunity, and his successful aim was to live a useful life. In business he commanded the respect of all with whom he came in contact, and his genial nature and considerate thought ripened that respect into permanent esteem. He was a firm, generous, and faithful friend, on whom implicit confidence was placed: on whose intelligent judgment it was safe to depend. His life, though brief as time is measured, was crowded with those attainments and excellencies which promised liberally for the future, and which make his death a loss that extends beyond the circle of his friends. The Hardware trade deem it a duty to themselves, no less than to Mr. Porter, to record their high appreciation of the character of their friend and business associate, and their sense of personal loss. And it is therefore

Resolved, That the death of Mr. Porter has removed from us, one whom we esteemed for his generous qualities of heart and life, and from association with whom we gained advantage and enjoyment.

Resolved, That his character has commanded the highest endorsement of his business associates, who have always found in him the expressions of noble endeavor and generous ambition.

Resolved, That the example he has set is that of a man imbued with lofty conceptions of the purpose of life, and inspired and controlled by those principles which elevate and dignify our humanity.

Resolved, That the Hardware trade unite in extending to the family of the deceased their warmest sympathy at their great affliction.

Resolved, That a copy of these resolutions be forwarded to the family of the deceased.

Chicago.

Office of The Iron Age, 36 and 38 Clark St., Cor. Lake St., CHICAGO, January 31, 1887.

Pig Iron.—The market continues strong, with an upward tendency. The demand from small buyers keeps the current moving, while an occasional 500 or 1000 ton lot is called for by large consumers, who find their requirements exceeding their expectations. No general buying movement is expected for some time from the larger classes of consumers, as they have made provision for their wants according to the custom of their respective branches of trade. Steel manufacturers have been making arrangements recently to secure a larger supply of Bessemer Iron, which has the effect of reducing the available furnace capacity for the general market. The position of the furnace companies supplying this territory is becoming stronger from day to day, and unless general trade receives an unexpected set-back prices will rule higher when spring opens and expiring contracts for Iron are sought to be renewed. Inquiries for Southern Iron are quite numerous, and large blocks could be placed at present prices for summer and fall delivery, but the furnace companies fully appreciate the coin of advantage which they now hold and are unwilling to meet buyers' views in this respect, although they are very willing to sell such small lots as they can spare for early delivery at the rates now ruling. Quotations for all kinds of Iron in this market now vary more than ever, old customers and favorable deliveries securing the minimum rates given and others being asked the outside price. We quote as follows on a cash basis, time rates being usually 50¢ per ton higher: Lake Superior Charcoal, Nos. 1, 2 and 3, \$24 @ \$25; Blackband Coke Softeners, \$24.50 @ \$25; Hanging Rock and Jackson County Soft, \$22; Straight Coke Foundry No. 1, \$23 @ \$24; Coke Foundry No. 2, \$22 @ \$23; Coke No. 3, \$21 @ \$21.50; Southern Coke Foundry No. 2, \$22.50 @ \$23, nominally.

Bar Iron.—Heavy inquiries are in the market, but no large sales are reported during the past week. Near-by mills are so full of orders for the immediate future that some of them have withdrawn from the market for the present, while others are asking 2.3¢ rates on New Puddled Iron, delivered on cars here. More distant mills are quoting 2.2¢ @ 2.25¢ on cars here; very few at the minimum rate, however. Prices from store range as high as 2.4¢ @ 2.5¢, the latter for small lots.

Structural Iron.—Bridge companies are purchasing small lots, but trade is generally quiet on account of the season. A great deal of work is reported in sight, however, both for bridges and buildings, and the spring promises to open up well in this line. Beams are still held at 3.8¢ from store; Angles, 2.75¢ @ 3¢ from store, and 2.60¢ on cars from mill; Tees, 3.25¢ from store.

Plates.—No change is reported in this line, business continuing very fair, with quotations for ordinary lots from store as follows: Iron Tank, 2.8¢; Shell, 3.25¢; Flange, 4.25¢; Steel Shell, 3.5¢; Flange, 4.25¢; Fire-box, 4.75¢.

Merchant Steel.—The demand holds up very well. Nothing worthy of note has

transpired during the week, but manufacturers' agents are looking for an early advance in prices, which are as follows: Ordinary Tool Steels, 8¢ @ 8.5¢; Specials, 13¢ @ 20¢; Spring, 3¢ @ 4¢; Sheet, 7¢ @ 11¢; Bessemer Machinery, 2.7¢ @ 3¢; Open-Hearth Machinery, 3¢; Crucible Machinery, 5¢.

Sheet Iron.—The demand for Common Sheets is light at present, although prices are firmer. Quotations from store are still 3¢ for No. 24, 3.1¢ for Nos. 25 and 26, and 3.2¢ for No. 27. In galvanized Iron very little has been done, the business for January falling considerably below that for December. Manufacturers' prices to jobbers are 62½¢ off on Juniata and 62½¢ and 5¢ off on Charcoal, while jobbers quote 60¢ off on Juniata and 60¢ and 5¢ off on Charcoal.

Steel Rails.—The situation is unchanged. Local mills are very full of work, deliveries in many cases running up to December. For such orders as can be sandwiched to suit makers quotations are \$40 @ \$42.50.

Old Rails and Wheels.—Old Iron Rails are being offered a little more freely, but the domestic supply is still very scanty. No sales are reported, but negotiations are pending at \$27.50 @ \$28. Foreign Rails are being offered in this market for future delivery at \$26 New York and \$25 Baltimore for T's, and \$26 Baltimore for Double Heads. Old Car Wheels are scarce and in demand. Buyers would pay \$22 for them, but holders are in doubt what to ask, believing they are worth as much as Lake Superior Charcoal Pig Iron.

Nails.—The demand is only fair, buyers being pretty well stocked up. Sales agents are apparently indifferent about business, claiming that there is no occasion to force it, as their factories need a little time to work up an assortment. Prices seem to be firmly maintained, and a disposition to put them even higher is manifested in some quarters, based upon the disparity between Bar Iron and Nail prices. But if prices should be advanced it will be on account of the enhanced cost of raw material, and not because of an inadequate supply, large or small quantities being available at \$2.55 for Iron and \$2.70 for Steel, with 10¢ off for carload lots.

Barb Wire.—Prices have moved upward since our last report, in consequence of firmer views among manufacturers as well as an increased demand from the general trade. The United Wire Company advanced prices to 3½¢ for Painted and 4½¢ for Galvanized, with ¼¢ off to jobbers, at their meeting in this city last week, a full report of which is given on page 30. Jobbers, however, had previously raised their rates to 3½¢ for Painted, and continued to sell at that price.

Hardware.—Notwithstanding the fact that this is mid-winter, when business is usually restricted within certain lines, the demand for Hardware keeps up very well, gently stimulated, of course, by the slight but constant advances in prices which are being made by manufacturers, and are duly reflected in jobbers' circulars. Last week an upward movement took place in Screws, in which by changes in the list an average advance of 10% was realized. Carriage Hardware is also firmer, in sympathy with other goods, and an advance is expected this week in Iron Axles, Half Patent.

Lead.—Some 1400 tons of Pig were sold in this market during the past week, and prices declined from 4.2¢ to 4.05¢, closing at 4.1¢ bid, with prospects of large transaction in the near future.

Coal Market.

Anthracite and Bituminous Coal is again moving quite freely, but all the companies are restricted by the difficulty which purchasers experience in taking it from the boats. In fact, no delivery is attempted excepting as parties agree to take it; in case of failure, the boat is at once transferred to another point. Reference is here made to shipments of Coal on fulfillment of contracts under old agreements, and the companies for the most part are restricted to business of this kind, as contractors necessarily have the precedence in the general scramble.

The Pennsylvania Coal Company are receiving Coal freely and taking new business at the old circular rates, which are \$3.60 for Broken, \$3.80 for Egg, \$4.15 for Stove, \$4.00 for Nut, and \$3 for Pea. The responsibility of the company ends when the Coal is alongside. The Berwind White Company are doing a good business at South Amboy, working a full complement of men. Stalwart picked men are sent down from time to time to replace any who may be either incompetent or disaffected. All the companies express confidence that the trade will be fully resumed in a few days, as the tonnage moving is gradually increasing. There are no prices for Bituminous, excepting among small jobbers and speculators. As remarked by one of the coal managers, Bituminous Coal would bring \$30 a ton if it was for sale. The trade was much disconcerted by a report that Austin Corbin, of the Reading Company, had made concessions, which they refused to believe, remarking that if correct difficulties would never end; in any case, Mr. Corbin could not speak for any but himself.

No action has yet been taken respecting the allotment for February. At a meeting of retail dealers in conference with the jobbers, Wednesday, the general situation was discussed.

The total amount of Anthracite Coal sent to market for the week was 554,366 tons, compared with 659,950 tons in the corresponding week last year. The total amount of Anthracite mined thus far in the year 1887 is 1,545,421 tons, compared with 1,591,940 tons for the same period last year, an increase of 46,519 tons.

The shipments from the mines of the Cumberland Coal region for the week were 41,290 tons, and for the year to date 1,41,657 tons, an increase of 12,748 tons as compared with the corresponding period of last year. The Reading Coal and Iron Company state that they have 40,000 tons of Coal at Port Richmond, but that owing to the scarcity of vessels freights to Boston are frequently quoted at \$2 ½ per ton.

Metal Market.

Copper.—Our market has been dreadfully dull during the week, and prices are tending downward. A few parcels of March and April delivery Lake have been sold at 11 15¢, and it looks as though there were more sellers than buyers. Spot is nominally held at 11 ¼¢, but buyers of large lines are scarce even at 11¢, owing in a great measure to the labor disturbances affecting the Copper and Metal trade generally quite as much as they do other branches. In London Best Selected has ruled steady, £43. 10/, while Chili Bars have ranged as follows: January 27, £38. 15/; 28th and 29th, £38. 12/; 31st, £38. 17/6; February 1, £39, and this morning, £38. 17/6.

Tin.—There has been a large speculative demand in this market for Tin since our last report, about 200 tons having been sold, spot and February, from 22.55¢ down to 22.50¢. Toward the close of last week however, the late sellers turned round and bought heavily March delivery at 22.65¢ @ 22.70¢, and shipments from London at 22.80¢ @ 22.85¢, but during the last few days things have come down again, owing to political matters abroad, and, while spot Tin still fetches 22.65¢, February was freely offered at 22.70¢ without attracting buyers, our market being adversely influenced by the strikes, &c. London came £101. 17/6 this morning spot Straits and £102. 17/6 three months. **Tin Plates.**—There has been a fair demand at unaltered prices. The stocks of some kinds are quite light and likely to remain so, as some of the makers are behindhand in these deliveries. Gradually they, however, all resume in Wales, and the impression begins to prevail here and in Liverpool that prices will not be higher in the near future. Meanwhile we quote in large lines per box: Martin-Siemens Steel Plates, Charcoal Finish, \$5; ditto, Coke Finish, \$4.60 @ \$4.65; Ternos, \$4.15 @ \$4.25, and Coke Tins, \$4.30 @ \$4.35. Liverpool has been quiet during the week at 13/6 Coke Tins.

Lead.—For some cause or another a much firmer feeling has seized upon the Lead markets, both here and especially out West, which is, in fact, a realization of the anticipations in that sense that had been foreshadowed for a month past, all agreeing that on both sides the Atlantic the Metal is, from a statistical point of view, in a remarkably strong position. All it requires now is a good consumptive demand, and this begins to manifest itself out West, added to which there is some speculative buying out there. After a sale of about 100 tons Common Domestic in lots in this market at the old prices of 4.25¢ @ 4.30¢, not a pound can be had now under 4.44¢ @ 4.50¢ here, while in St. Louis the nominal figure is still 4.15¢, though not much if any obtainable thereat. Refined remains scarce at 4½¢. In London Soft Spanish commands £12. 15/, and English Pig £13.

Spelter and Zinc.—A moderate local demand has continued to prevail, which, as to brands, has been filled at between 4½¢ @ 4¾¢, while Silesia remains nominally \$4.90 here, and is quoted unaltered in London £14. 10/. Advances from Breslau are to the effect that members of the syndicate there and in Belgium are indefatigable in their endeavors to fix on a strong basis, production on the one hand and a higher price on the other, in which they may succeed, as there is at present great success in fortifying syndicates in most merchandise branches. In fact, everything would go on swimmingly in Europe but for the war scare, which may keep people in a feverish condition over there till a solution either way be reached in a month's time, or in several months' time. Till then everything will remain uncertain there, whether it relate to Spelter or any other commodity.

Sheet Zinc.—Is ¼¢ better, and Domestic must now be quoted 5.65¢ @ 5.85¢.

Antimony.—An improved jobbing demand is reported for Cookson at 9¢, and for Hallett at 7½¢.

New York Metal Exchange.

The following sales are reported:

THURSDAY, January 27.

10 tons Tin, January	22.60¢
50 tons Tin, February	22.60¢
10 tons Tin, February (last half)	21.57½¢
30 tons Tin, spot	22.57½¢
20 tons Tin, February	22.57½¢
10 tons Tin, after February 10	22.55¢
30 tons Tin, spot	22.55¢
50 tons Tin, January	22.55¢

FRIDAY, January 28.

10 tons Tin, February	22.60¢
10 tons Tin, March	22.60¢
10 tons Tin, February	22.58¢
10 tons Tin, March	22.58¢
90 tons Tin, March	22.60¢
25 tons Chili Bars, April	39.10¢

SATURDAY, January 29.

10 tons Tin, January	22.50¢
10 tons Tin, March	22.50¢
10 tons Tin, January	22.50¢
50 tons Tin, prompt shipment	22.75¢
50 tons Tin, March	22.70¢
25,000 lb Lake Copper, April	11.15¢

MONDAY, January 31.

10 tons Tin, prompt shipment	22.80¢
50 tons Tin, prompt shipment	22.85¢

TUESDAY, February 1.

20 tons Tin, Spot	22.65¢
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WASHINGTON NEWS.

(From Our Regular Correspondent.)

WASHINGTON, D. C., February 1, 1887.

Speaker Carlisle and Mr. Randall have been in conference on the parliamentary points in regard to the revenue reduction bill, and have agreed to confer with their friends in order to determine upon a time for going into Committee of the Whole. Mr. Randall's friends do not intend to be caught napping, and are throwing out hints that unless a movement be made by Saturday they will on next Monday, being suspension day, make a motion to suspend the rules on a bill to repeal the internal revenue taxes on tobacco and spirits used in the arts and nothing else. Such a measure would secure a very general Republican vote, besides the bulk of the Democrats who are in favor of a repeal of the tobacco tax. Whether they would foot up the necessary two-thirds remains to be seen. The Republicans are talking of a similar scheme, but in neither case could a suspension of the rules be had without a very large following of the other side of the House. The tariff features assented to by Mr. Randall will give his bill a somewhat stormy career in the House should it be taken up. In the Senate, should it ever reach there, it will be materially amended by the Committee on Finance. The Senators, as a rule, favor internal revenue repeal, but not disarrangement of the tariff at this session. The prospects of concurrent action within the five weeks remaining of the session are not encouraging. The Randall bill is entitled, "A Bill to Reduce and Equalize Duties on Imports and to Modify the Laws in Relation to the Collection of the Revenue." The new bill is proposed as a substitute for his measure of last session.

THE SURPLUS.

The majority of the House is increasing in uneasiness in the face of the fact that but 40,000,000 of the redeemable 3 per cent. are available; that the surplus is now \$100,000,000 and will after the above bonds are called, go on accumulating at the rate of from 6,000,000 to 12,000,000 a month. The effect of such an accumulation of the circulating medium upon the business of the country is the immediate problem before Congress and the Administration. It is quite natural in the face of their responsibility that some apprehension should be felt.

THE INTERSTATE COMMERCE BILL.

The Attorney General has concluded his opinion as to the constitutional features of the Interstate Commerce Bill. He shows that Congress has the right to regulate commerce between the States, but there may exist a line between the power of Congress to regulate and its right to direct the affairs of private corporations. The expediency of such a serious piece of legislation is another question involved in the President's final disposition of the bill before Saturday by its approval, by its veto, or by permitting it to become a law through expiration of constitutional limit. The unanimity with which the bill was passed would be an argument in favor of its approval on the ground of such a strong endorsement of what might be supposed to represent the views of the people. Those Senators and Representatives who are close to the President incline to the belief that he will sign it. They even go so far as to intimate that he has been in conference with his friends as to the individuals who shall constitute the personnel of the commission. The general impression is that the bill will be so odious within the next 12 months that the majority which enacted it will be in equal haste to secure its repeal. The intimation that long hauls will be scaled up to the rate of short hauls by the through roads had already demoralized the Western Members who voted for the bill.

A MODEL OF A WAR SHIP.

A beautiful model of gunboat No. 1 now being built by the Cramps, of Philadelphia, has been placed on exhibition in the room of the Committee on Naval Affairs of the House. It represents a 1700-ton vessel with an armament of 6 six inch rifle guns, five Hotchkiss cannon and one gatling gun. The speed of the vessel will be 16 knots an hour. The model gives great satisfaction to the members of the committee, and has been examined by many of the members of the House.

Rumors of the sale of the Jackson Mine, the oldest and one of the largest iron mines in the Lake Superior district, were confirmed by Capt. Henry Merry, local superintendent. The Jackson Mine was opened in 1852, and 2,507,958 tons of iron ore have been mined from it up to December 31, 1886. The value of this product is \$20,000,000. The controlling interest in the mine has been secured by Stone, Chisholm & Jones, of Cleveland, and Samuel Mitchell, Wegaunee, for \$1,440,000. The Jackson Company own the turnpike at Fayette, on Lake Michigan, and large tracts of mineral and timber lands. The new management will largely increase the output of iron ore this year.

The announcements made last week of the letting by the Atchison, Topeka and Santa Fe Railroad Company, of contracts for 4800 freight cars were true except in one particular. The bids for their construction were submitted, but the awards were not given. The terms were the delivery of the cars at Chicago between August 1 and December 31 of the current year. There is a boom in car construction, and the various works throughout the country are overrun with orders, and the bids submitted took into account this state of things and ranged about 6 per cent. higher than the same class of work commanded six months ago. The Atchison officials rather rebelled at this state of affairs, and still hold the bids under consideration.

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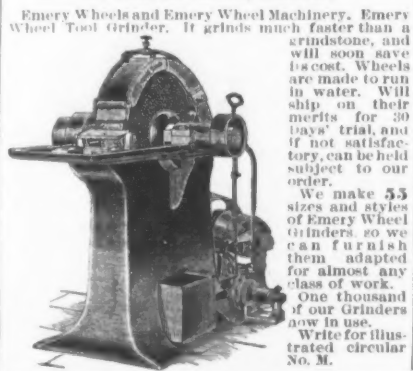
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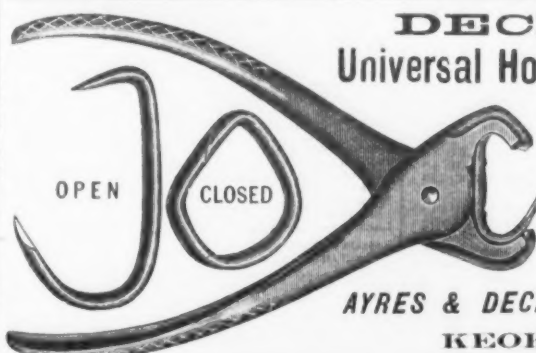
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Springfield Glue & Emery Wheel Co. SPRINGFIELD, MASS.



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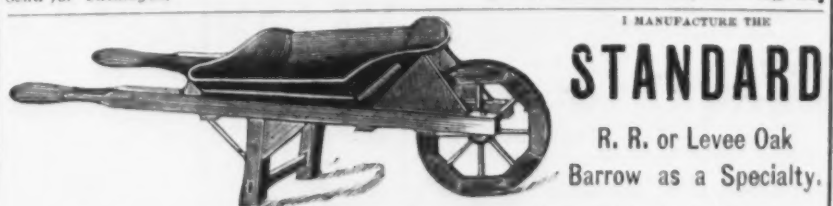
Correspondence solicited from all dealers desirous of handling FIRST-CLASS COOPS. Address Manufacturers.

E. S. & F. BATEMAN, Spring Mills, N. J.

WANTED—HARDWARE MERCHANTS TO ACT AS AGENTS.



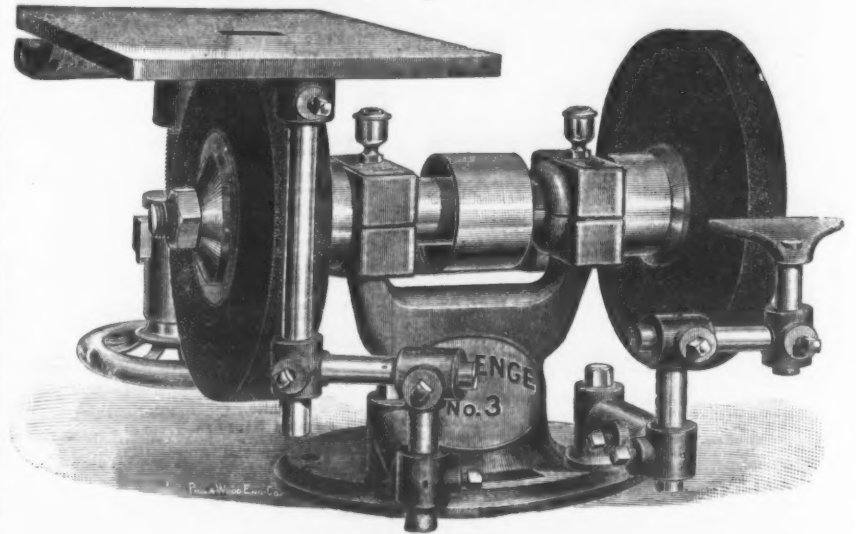
THE PATENT ENAMEL CO., 84 West Broadway, New York.
STREET NAMES, STATION NAMES, ADVERTISING SIGNS, PUSH AND PULL PLATES, NUMBERS, &c.
Send for Catalogue. F. E. MARSLAND, Sole Agent.



The Strongest and Most Durable Barrow in the Market. Write for Prices.
HENRY PRESCOTT, Portsmouth, O.

THE WELLINGTON SOLID EMERY WHEEL.
Special care has been taken in the manufacture of this Wheel to avoid danger from bursting and secure uniform density. It is a free and rapid cutter, and a desirable Wheel for persons whose work requires a Wheel to run as cool as possible when run dry. It makes a clean, brilliant cut, which will be found desirable for many classes of work.
THE WELLINGTON EMERY WHEEL CO., 103 North 10th Street, Philadelphia, Pa.

DIEBEL MANUFACTURING COMPANY, PHILADELPHIA, PA., U. S. A.



MANUFACTURERS OF

EMERY GRINDERS & POLISHING MACHINES, Pulleys, Columns and Countershafts.

No. 3 Grinder with surface grinding attachment. Size of Surface Plate 9 x 14 inches, for grinding Die Plates, Flat Irons, Spirit Levels, Lock Fronts, Escutcheon Plates, Gibson Keys, &c. The machine is indispensable wherever a perfectly true flat surface is required. Price of grinder and surface attachment complete \$35. For sale by leading machinery dealers in the United States. See Catalogue.

THE BUCK-THORN BARB FENCE.

NO ADVANCE IN PRICE.

SPRING CIRCULAR.

TRENTON, N. J., February 1, 1887.

THE BUCK-THORN FENCE COMPANY have the pleasure of announcing that they have determined to make no advance in prices at present, although, as is well known, the price of every other style of barb fence, and of all kinds of wire, as also of raw material, is much higher and steadily advancing.

We shall not only stand by last year's prices, but we are now able to supply the Buck-Thorn much improved in quality and form, and about as near perfection as is likely to be attained.

We shall adhere to our plan of exclusive agencies, giving them entire control, and selling no other house where they are located.

Our several Jobbing Agents will at all times furnish the Buck-Thorn at our prices. They are as follows:

John A. Roebbing's Sons Co., New York.
Lockwood, Taylor & Co., Cleveland.
The Todd-Donigan Iron Co., Louisville.
Standart Brothers, Detroit.
Hanson, VanCamp Co., Indianapolis.
C. W. & H. W. Middleton, Philadelphia.

Carlin & Fulton, Baltimore.
The Pappenheimer Hdw. Co., Cincinnati.
The North Western Hardware Co., Chicago.
The North Western Hardware Co., St. Louis.
Tomlinson & Satterthwaite, Trenton.

We take this occasion to renew our thanks to our many excellent agents, mindful of the fact that the great popularity which the Buck-Thorn has attained is largely due to their intelligent and earnest efforts and faithful work.

We again beg to emphasize the fact that we absolutely guarantee every bundle of Buck-Thorn sent out to be sound and perfect in every respect.

All orders shall have our best attention, and shipment will be made on the day they are received, unless otherwise directed.

Circulars, Samples and Price List to all applicants.

HENRY C. KELSEY,
Sec'y and Treas.

SYRACUSE CHILLED PLOW CO. SYRACUSE, N. Y.,

MANUFACTURERS OF

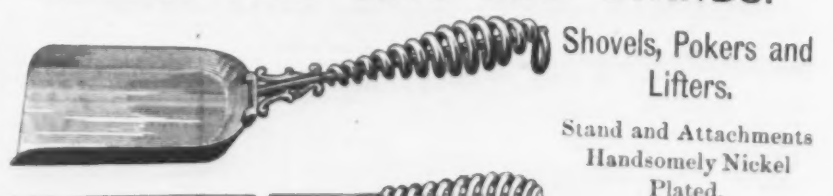
Right & Left Hand Sulky Plows, Swivel Plows,
Reversible Sulky Plows, Single, Double & Wing Shovels,
Steel Beam Plows, Steel Frame Cultivators,
Iron Beam Plows, Wood Frame Cultivators,
Wood Beam Plows, Road Scrapers,
Grappling Hay Forks, Etc., Etc., Etc.

Send for ILLUSTRATED CATALOGUE and PRICE-LIST.

ALASKA POKERS AND LIFTERS

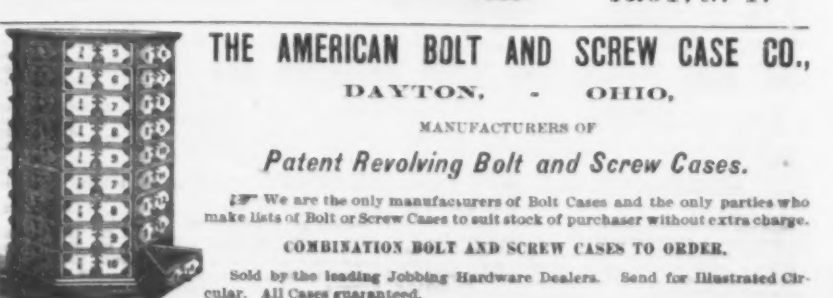
NEVER BECOME HEATED TO BURN THE HANDS.

ALASKA FIRE SETS AND STANDS.



Patentees and Sole Mfgs.,

**TROY NICKEL WORKS,
TROY, N. Y.**



We are the only manufacturers of Bolt Cases and the only parties who make lists of Bolt or Screw Cases to suit stock of purchaser without extra charge.

COMBINATION BOLT AND SCREW CASES TO ORDER.

Sold by the leading Jobbing Hardware Dealers. Send for Illustrated Circular. All Cases guaranteed.

The Interstate Commerce Bill.

For the information of those for whom it has interest we give herewith the full text of the Interstate Commerce bill as transmitted to the President:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

That the provisions of this act shall apply to any common carrier or carriers engaged in the transportation of passengers or property wholly by railroad, or partly by railroad and partly by water when both are used, under a common control, management, or arrangement, for a continuous carriage or shipment, from one State or Territory of the United States or the District of Columbia, or from any place in the United States to an adjacent foreign country, or from any place in the United States through a foreign country to any other place in the United States, and also to the transportation in like manner of property shipped from any place in the United States to a foreign country and carried from such place to a port of transshipment, or shipped from a foreign country to any place in the United States and carried to such place from a port of entry either in the United States or an adjacent foreign country. Provided, however, that the provisions of this act shall not apply to the transportation of passengers or property, or to the receiving, delivering, storage or handling of property, wholly within one State, and not shipped to or from a foreign country from or to any State or Territory as aforesaid.

The term "railroad" as used in this act shall include all bridges and ferries used or operated in connection with any railroad, and also all the road in use by any corporation operating a railroad, whether owned or operated under a contract, agreement or lease; and the term "transportation" shall include all instrumentalities of shipment or carriage. All charges made for any service rendered or to be rendered in the transportation of passengers or property as aforesaid, or in connection therewith, or for the receiving, delivery, storage or handling of such property, shall be reasonable and just, and every unjust, unreasonable charge for such service is prohibited and declared to be unlawful.

Sec. 2. That if any common carrier subject to the provisions of this act shall, directly or indirectly, by any special rate, rebate, drawback, or other device, common service, charge, demand, collect, or receive from any person or persons a greater or a less compensation for any service rendered, or to be rendered, in the transportation of passengers or property, subject to the provisions of this act, than it charges, demands, collects, or receives from any other person or persons for doing for him or them a like or contemporaneous service in the transportation of a like kind of traffic under substantially similar circumstances and conditions, such common carrier shall be deemed guilty of unjust discrimination, which is hereby prohibited and declared to be unlawful.

Sec. 3. That it shall be unlawful for any common carrier subject to the provisions of this act to make or give any undue or unreasonable preference or advantage to any particular person, company, firm, corporation or locality, or any particular description of traffic, in any respect whatsoever, or to subject any particular person, company, firm, corporation or locality, or any particular description of traffic, to any undue or unreasonable prejudice or disadvantage in any respect whatsoever. Every common carrier subject to the provisions of this act shall, according to their respective powers, afford all reasonable, proper and equal facilities for the interchange of traffic between their respective lines, and for the receiving, forwarding and delivering of passengers and property to and from their several lines and those connecting therewith, and shall not discriminate in their rates and charges between such connecting lines; but this shall not be construed as requiring any such common carrier to give the use of its tracks or terminal facilities to another carrier engaged in like business.

Sec. 4. That it shall be unlawful for any common carrier subject to the provisions of this act to charge or receive any greater compensation in the aggregate for the transportation of passengers or property of like kind of property, under substantially similar circumstances and conditions, for a shorter than for a longer distance over the same line, in the same direction, the shorter being included within the longer distance; but this shall not be construed as authorizing any common carrier within the terms of this act to charge and receive as great compensation for a shorter as for a longer distance: Provided, however, That upon application to the commission appointed under the provisions of this act such common carrier may, in special cases, after investigation by the commission, be authorized to charge less for longer than for shorter distances for the transportation of passengers or property; and the commission may from time to time prescribe the extent to which such designated common carrier may be relieved from the operation of this section of this act.

Sec. 5. That it shall be unlawful for any common carrier subject to the provisions of this act to enter into any contract, agreement, or combination with any other common carrier or carriers for the pooling of freights of different and competing railroads, or to divide between them the aggregate or net proceeds of the earnings of such railroads, or any portion thereof; and in any case of an agreement for the pooling of freights as aforesaid, each day of its continuance shall be deemed a separate offense.

Sec. 6. That every common carrier subject to the provisions of this act shall print and keep for public inspection schedules showing the rates and fares and charges for the transportation of passengers and property which

any such common carrier has established and which are in force at the time upon its railroad, as defined by the first section of this act. The schedules printed as aforesaid by any such common carrier shall plainly state the places upon its railroad between which property and passengers will be carried, and shall contain the classification of freight in force upon such railroad, and shall also state separately the terminal charges and any rules or regulations which in any wise change, affect or determine any part of the aggregate of such aforesaid rates and fares and charges. Such schedules shall be plainly printed in large type of at least the size of ordinary pica, and copies for the use of the public shall be kept in every depot or station upon any such railroad, in such places and in such form that they can be conveniently inspected. Any common carrier subject to the provisions of this act receiving freight in the United States to be carried through a foreign country to any place in the United States shall also in like manner print and keep for public inspection, at every depot where such freight is received for shipment, schedules showing the through rates established and charged by such common carrier to all points in the United States beyond the foreign country to which it accepts freight for shipment; and any freight shipped from the United States through a foreign country into the United States, the through rate on which shall not have been made public as required by this act, shall, before it is admitted into the United States from said foreign country, be subject to customs duties as if said freight were of foreign production, and any law in conflict with this section is hereby repealed.

No advance shall be made in the rates, fares and charges which have been established and published as aforesaid by any common carrier in compliance with the requirements of this section, except after 10 days' public notice, which shall plainly state the changes proposed to be made in the schedule then in force, and the time when the increased rates, fares or charges will go into effect; and the proposed changes shall be shown by printing new schedules, or shall be plainly indicated upon the schedules in force at the time and kept for public inspection. Reductions in such public rates, fares or charges may be made without previous public notice; but whenever any such reduction is made, notice of the same shall immediately be publicly posted, and the changes made shall immediately be made public by printing new schedules, or shall immediately be plainly indicated upon the schedules at the time in force and kept for public inspection. And when any such common carrier shall have established and published its rates, fares and charges, in compliance with the provisions of this section, it shall be unlawful for such common carrier to charge, demand, collect or receive from any person or persons a greater or less compensation for the transportation of passengers or property, or for any services in connection therewith, than is specified in such published schedule of rates, fares and charges as may at the time be in force.

Every common carrier subject to the provisions of this act shall file with the commission hereinafter provided for copies of its schedules of rates, fares and charges which have been established and published in compliance with the requirements of this section, and shall promptly notify said commission of all changes made in the same. Every such common carrier shall also file with said commission copies of all contracts, agreements or arrangements with other common carriers in relation to any traffic affected by the provisions of this act to which it may be a party. And in cases where passengers and freight pass over continuous lines or routes operated by more than one common carrier, and the several common carriers operating such lines or routes establish joint tariffs of rates or fares or charges for such continuous lines or routes, copies of such joint tariffs shall also, in like manner, be filed with said commission. Such joint rates, fares and charges on such continuous lines so filed as aforesaid shall be made public by such common carriers when directed by said commission, in so far as may, in the judgment of the commission, be deemed practicable; and said commission shall from time to time prescribe the measure of publicity which shall be given to such rates, fares and charges, or to such part of them as it may deem it practicable for such common carriers to publish, and the places in which they shall be published; but no common carrier party to any such joint tariff shall be liable for the failure of any other common carrier party thereto to observe and adhere to the rates, fares or charges thus made and published. If any such common carrier shall neglect or refuse to file or publish its schedules or tariffs of rates, fares and charges as provided in this section, or any part of the same, such common carrier shall, in addition to other penalties herein prescribed, be subject to a writ of mandamus, to be issued by any circuit court of the United States in the judicial district wherein the principal office of said common carrier is situated or wherein such offense may be committed, and if such common carrier be a foreign corporation, in the judicial circuit wherein such common carrier accepts traffic, and has an agent to perform such service, to compel compliance with the aforesaid provisions of this section; and such writ shall issue in the name of the people of the United States, at the relation of the commissioners appointed under the provisions of this act; and failure to comply with its requirements shall be punishable as and for a contempt; and the said commissioners, as complainants, may also apply, in any such circuit court of the United States, for a writ of injunction against such common carrier, to restrain such common carrier from receiving or transporting property among the several States and Territories of the United States, or between the United States and adjacent foreign countries, or between ports of transshipment and of entry and the several States and Territories of the United States, as mentioned in the first section of this act, until such common carrier shall have com-

plied with the aforesaid provisions of this section of this act.

Sec. 7. That it shall be unlawful for any common carrier subject to the provisions of this act to enter into any combination, contract or agreement, expressed or implied, to prevent, by change of time schedule, carriage in different cars, or by other means or devices, the carriage of freights from being continuous from the place of shipment to the place of destination, and no break of bulk, stoppage or interruption made by such common carrier shall prevent the carriage of freights from being and being treated as one continuous carriage from the place of shipment to the place of destination, unless such break, stoppage or interruption was made in good faith for some necessary purpose, and without any intent to avoid or unnecessarily interrupt such continuous carriage or to evade any of the provisions of this act.

Sec. 8. That in case any common carrier subject to the provisions of this act shall do, cause to be done, or permit to be done any act, matter, or thing in this act prohibited or declared to be unlawful, or shall omit to do any act, matter, or thing in this act required to be done, such common carrier shall be liable to the person or persons injured thereby for the full amount of damages sustained in consequence of any such violation of the provisions of this act, together with a reasonable counsel or attorney's fee, to be fixed by the court in every case of recovery, which attorney's fee shall be taxed and collected as part of the costs in the case.

Sec. 9. That any person or persons claiming to be damaged by any common carrier subject to the provisions of this act may either make complaint to the commission as hereinafter provided for, or may bring suit in his or their own behalf for the recovery of the damages for which such common carrier may be liable under the provisions of this act, in any district or circuit court of the United States of competent jurisdiction; but such person or persons shall not have the right to pursue both of said remedies, and must in each case elect which one of the two methods of procedure herein provided for he or they will adopt. In any such action brought for the recovery of damages the court before which the same shall be pending may compel any director, officer, receiver, trustee or agent of the corporation or company defendant in such suit to attend, appear and testify in such case, and may compel the production of the books and papers of such corporation or company party to such suit; the claim that any such testimony or evidence may tend to criminate the person giving such evidence shall not excuse such witness from testifying, but such evidence or testimony shall not be used against such person on the trial of any criminal proceeding.

Sec. 10. That any common carrier subject to the provisions of this act, or whenever such common carrier is a corporation, any director or officer thereof, or any receiver, trustee, lessee, agent or person acting for or employed by such corporation, who, alone or with any other corporation, company, person or party, shall willfully do or cause to be done, or shall willfully suffer or permit to be done, any act, matter or thing in this act prohibited or declared to be unlawful, or who shall aid or abet therein, or shall willfully omit or fail to do any act, matter or thing in this act required to be done, or shall cause or unwillingly suffer or permit any act, matter or thing so directed or required by this act to be done not to be so done, or shall aid or abet any such omission or failure, or shall be guilty of any infraction of this act, or shall aid or abet therein, shall be deemed guilty of a misdemeanor, and shall upon conviction thereof in any district court of the United States within the jurisdiction of which such offense was committed, be subject to a fine of not to exceed \$5000 for each offense.

Sec. 11. That a commission is hereby created and established, to be known as the Interstate Commerce Commission, which shall be composed of five commissioners, who shall be appointed by the President, by and with the advice and consent of the Senate. The commissioners first appointed under this act shall continue in office for the term of two, three, four, five and six years, respectively, from the 1st day of January A.D. 1887, the term of each to be designated by the President; but their successors shall be appointed for terms of six years, except that any person chosen to fill a vacancy shall be appointed only for the unexpired term of the commissioner whom he shall succeed. Any commissioner may be removed by the President for inefficiency, neglect of duty or malfeasance in office. Not more than three of the commissioners shall be appointed from the same political party. No person in the employ of, or holding any official relation to, any common carrier subject to the provisions of this act, or owning stock or bonds thereof, or who is in any way pecuniarily interested therein, shall enter upon the duties of or hold such office. Said commissioners shall not engage in any other business, vocation or employment. No vacancy in the commission shall impair the right of the remaining commissioners to exercise all the powers of the commission.

Sec. 12. That the commission hereby created shall have authority to inquire into the management of the business of all common carriers subject to the provisions of this act, and shall keep itself informed as to the manner and method in which the same is conducted, and shall have the right to obtain from such common carriers full and complete information necessary to enable the commission to perform the duties and carry out the objects for which it was created; and for the purposes of this act the commission shall have power to require the attendance and testimony of witnesses and the production of all books, papers, tariffs, contracts, agreements and documents relating to any matter under investigation, and to that end may invoke the aid of any court of the United States in requiring the attendance and testimony of witnesses and the production of books, papers and documents under the provisions of this section. And any of the circuit courts of the United States within the jurisdiction of which such inquiry

is carried on may, in case of contumacy or refusal to obey a subpoena issued to any common carrier subject to the provisions of this act, or other person, issue an order requiring such common carrier or other person to appear before said commission (and produce books and papers if so ordered) and give evidence touching the matter in question; and any failure to obey such order of the court may be punished by such court as a contempt thereof. The claim that any such testimony or evidence may tend to criminate the person giving such evidence shall not excuse such witness from testifying; but such evidence or testimony shall not be used against such person on the trial of any criminal proceeding.

Sec. 13. That any person, firm, corporation or association, or any mercantile, agricultural or manufacturing society, or any body politic or municipal organization, complaining of anything done or omitted to be done by any common carrier subject to the provisions of this act in contravention of the provisions thereof, may apply to said commission by petition, which shall briefly state the facts; whereupon a statement of the charges thus made shall be forwarded by the commission to such common carrier, who shall be called upon to satisfy the complaint or to answer the same in writing within a reasonable time, to be specified by the commission. If such common carrier, within the time specified, shall make reparation for the injury alleged to have been done, said carrier shall be relieved of liability to the complainant only for the particular violation of law thus complained of. If such carrier shall not satisfy the complaint within the time specified, or there shall appear to be any reasonable ground for investigating said complaint, it shall be the duty of the commission to investigate the matters complained of in such manner and by such means as it shall deem proper. Said commission shall in like manner investigate any complaint forwarded by the railroad commissioner or railroad commission of any State or Territory, at the request of such commissioner or commission, and may institute any inquiry on its own motion in the same manner and to the same effect as though complaint had been made. No complaint shall at any time be dismissed because of the absence of direct damage to the complainant.

Sec. 14. That whenever an investigation shall be made by said commission, it shall be its duty to make a report in writing in respect thereto, which shall include the findings of fact upon which the conclusions of the commission are based, together with its recommendation as to what reparation, if any, should be made by the common carrier to any party or parties who may be found to have been injured; and such findings so made shall thereafter, in all judicial proceedings, be deemed *prima facie* evidence as to each and every fact found. All reports of investigations made by the commission shall be entered of record, and a copy thereof shall be furnished to the party who may have complained, and to any common carrier that may have been complained of.

Sec. 15. That if in any case in which an investigation shall be made by said commission it shall be made to appear to the satisfaction of the commission, either by the testimony of witnesses or other evidence, that anything has been done or omitted to be done in violation of the provisions of this act, or of any law cognizable by said commission, by any common carrier, or that any injury or damage has been sustained by the party or parties complaining, or by other parties aggrieved in consequence of any such violation, it shall be the duty of the commission to forthwith cause a copy of its report in respect thereto to be delivered to such common carrier, together with a notice to said common carrier to cease and desist from such violation, or to make reparation for the injury so found to have been done, or both, within a reasonable time, to be specified by the commission; and if, within the time specified, it shall be made to appear to the commission that such common carrier has ceased from such violation of law, and has made reparation for the injury found to have been done, in compliance with the report and notice of the commission, or to the satisfaction of the party complaining, a statement to that effect shall be entered of record by the commission, and the said common carrier shall thereupon be relieved from further liability or penalty for such particular violation of law.

Sec. 16. That whenever any common carrier, as defined in and subject to the provisions of this act, shall violate or refuse or neglect to obey any lawful order or requirement of the commission in this act named, it shall be the duty of the commission and lawful for any company or person interested in such order or requirement, to apply, in a summary way, by petition, to the circuit court of the United States sitting in equity in the judicial district in which the common carrier complained of has its principal office, or in which the violation or disobedience of such order or requirement shall happen, alleging such violation or disobedience, as the case may be; and the said court shall have power to hear and determine the matter, on such short notice to the common carrier complained of as the court shall deem reasonable; and such notice may be served on such common carrier, his or its officers, agents or servants, in such manner as the court shall direct; and said court shall proceed to hear and determine the matter speedily as a court of equity and without the formal pleadings and proceedings applicable to ordinary suits in equity, but in such manner as to do justice in the premises; and to that end such court shall have power, if it think fit, to direct and prosecute in such mode and by such persons as it may appoint, all such inquiries as the court may think needful to enable it to form a just judgment in the matter of such petition; and on such hearing the report of said commission shall be *prima facie* evidence of the matters therein stated; and if it be made to appear to such court, on such hearing or on report of any such person or persons, that the lawful order or requirement of said com-

mission drawn in question has been violated or disobeyed, it shall be lawful for such court to issue a writ of injunction or other proper process, mandatory or otherwise, to restrain such common carrier from further continuing such violation or disobedience of such order or requirement of said commission and enjoining obedience to the same; and in case of any disobedience of any such writ of injunction or other proper process, mandatory or otherwise, it shall be lawful for such court to issue writs of attachment, or any other process of said court incident or applicable to writs of injunction or other proper process, mandatory or otherwise, against such common carrier, and if a corporation, against one or more of the directors, officers or agents of the same, or against any owner, lessee, trustee, receiver or other person failing to obey such writ of injunction or other proper process, mandatory or otherwise; and said court may, if it shall think fit, make an order directing such common carrier or other person so disobeying such writ of injunction or other proper process, mandatory or otherwise, to pay such sum of money not exceeding for each carrier or person in default the sum of \$500 for every day after a day to be named in the order that such carrier or other person shall fail to obey such injunction or other proper process, mandatory or otherwise; and such moneys shall be payable as the court shall direct, either to the party complaining or into the court, to abide the ultimate decision of the court, or into the treasury; and payment thereof may, without prejudice to any other mode of recovering the same, be enforced by attachment or order in the nature of a writ of execution, in like manner as if the same had been recovered by a final decree in personam in such court. When the subject in dispute shall be of the value of \$2000 or more, either party to such proceeding before said court may appeal to the Supreme Court of the United States, under the same regulations now provided by law in respect of security for such appeal; but such appeal shall not operate to stay or supersede the order of the court or the execution of any writ or process thereon; and such court may, in every such matter, order the payment of such costs and counsel fees as shall be deemed reasonable. Whenever any such petition shall be filed or presented by the commission it shall be the duty of the district attorney, under the direction of the Attorney-General of the United States, to prosecute the same; and the costs and expenses of such prosecution shall be paid out of the appropriation for the expenses of the courts of the United States. For the purposes of this act, excepting its penal provisions, the circuit courts of the United States shall be deemed to be always in session.

Sec. 17. That the commission may conduct its proceedings in such manner as will best conduce to the proper dispatch and to the ends of justice. A majority of the commission shall constitute a quorum for the transaction of business, but no commissioner shall participate in any hearing or proceeding in which he has any pecuniary interest. Said commission may, from time to time, make or amend such general rules or orders as may be requisite for the order and regulation of proceedings before it, including forms of notices and the service thereof, which shall conform, as nearly as may be, to those in use in the courts of the United States. Any party may appear before said commission, and be heard in person or by attorney. Every vote and official act of the commission shall be entered of record, and its proceedings shall be public upon the request of either party interested. Said commission shall have an official seal, which shall be judicially noticed. Either of the members of the commission may administer oaths and affirmations.

Sec. 18.—That each commissioner shall receive an annual salary of \$7500, payable in the same manner as the salaries of judges of the courts of the United States. The commission shall appoint a secretary, who shall receive an annual salary of \$3500, payable in like manner. The commission shall have authority to employ and fix the compensation of such other employees as it may find necessary to the proper performance of its duties, subject to the approval of the Secretary of the Interior. The commission shall be furnished by the Secretary of the Interior with suitable offices and all necessary office supplies. Witnesses summoned before the commission shall be paid the same fees and mileage that are paid witnesses in the courts of the United States. All of the expenses of the commission, including all necessary expenses for transportation incurred by the commissioners, or by their employees under their orders, in making any investigation in any other places than in the city of Washington, shall be allowed and paid, on the presentation of the itemized vouchers therefore approved by the chairman of the commission and the Secretary of the Interior.

Sec. 19. That the principal office of the commission shall be in the city of Washington, where its general sessions shall be held, but whenever the convenience of the public or of the parties may be promoted or delay or expense prevented thereby, the commission may hold special sessions in any part of the United States. It may, by one or more of the commissioners, prosecute an inquiry necessary to its duties, in any part of the United States, into any matter or question of fact pertaining to the business of any common carrier subject to the provisions of this act.

Sec. 20. That the commission is hereby authorized to require annual reports from all common carriers subject to the provisions of this act, to fix the time and prescribe the manner in which such reports shall be made, and to require from such carriers specific answers to all questions upon which the commission may need information. Such annual reports shall show in detail the amount of capital stock issued, the amounts paid therefor, and the manner of payment for the same; the dividends paid, the surplus fund, if any, and the number of stockholders; the funded and floating debts, and the interest paid

Definition of Railroad.

Rates by Common Carriers.

Preference and facilities.

Equal Rates for Equal Service.

Contracts.

Schedules of Rates.

Public Notice of Change of Rates.

Filing and Publication of Schedules.

U. S. R. R. Commission.

Appeals to Commission.

Reports by Commission.

Proceedings in Commission.

Salaries, headquarters, etc.

Disobedience by Common Carriers.

Powers of Commission.

Annual Reports.

WHOLESALE METAL PRICES, FEBRUARY 2, 1887.

METALS.

IRON.—Duty: Bars, 8-10¢ to 11-10¢; provided that no bar iron shall pay a less rate of duty than 35¢. Sheet, 11-04¢ to 15-10¢. Band, Hoop and Rod, 1¢ to 1-10¢. Railroad Bars weighing more than 25 lb. per yard, 7-10¢ of 1¢ per lb.

Standard American Pig Iron.
Foundry No. 1 X..... 23.00 @ 23.00
Foundry No. 2 X..... 20.00 @ 21.00
Gray Forge..... 18.50 @ 19.00

No. 1 Scotch Pig Iron.
Carnbroe..... 20.75 @ 20.75
Coltess..... 23.50 @ 24.00
Shotts..... 23.00 @ 23.50
Glenbrook..... 22.00 @ 22.50
Gartshorne..... 22.50 @ 23.00
Langdon..... 23.00 @ 23.50
Suimerlee..... 21.00 @ 21.50
Dalmellington..... 21.00 @ 21.50
Edinburgh..... 21.00 @ 21.50
Clyde..... 21.00 @ 21.50

Rails.
Steel at Eastern mills..... 20.00 @ 20.00
Old Rails, Ts..... 20.00 @ 20.00

Scrap.
Wrought, 20 ton, from yard..... 25.00 @ 25.00

Bar Iron from Store.
Common Iron, round and square..... 2.20 @ 2.20
1 to 6 in. x 1/2 in. to 1 in. x 1/2 in. @ 2.20
Refined Iron:
1 to 6 in. round and square..... 2.40 @ 2.40
1 to 6 in. x 1/2 in. to 1 in. x 1/2 in. @ 2.40
1 to 6 in. x 1/2 in. to 1 in. x 1/2 in. @ 2.40
Rods—1/2 in. and 1-1/2 in. round and square..... 2.50 @ 2.50
Rods—1 to 6 in. to No. 12..... 2.50 @ 2.50
Burden's "B. & S." Iron, base price..... 3.50 @ 3.50
Norway Rods..... 3.00 @ 3.00

Sheet Iron from Store.
Common (Close)..... 2.50 @ 2.50
Nos. 10 to 16..... 2.50 @ 2.50
17 to 20..... 2.50 @ 2.50
21 to 24..... 2.50 @ 2.50
25 and 26..... 2.50 @ 2.50
27..... 2.50 @ 2.50
28..... 2.50 @ 2.50

Galvanized to 20...... 4.00 @ 4.00
Galvanized 1 to 24..... 4.50 @ 4.50
Galvanized 25 to 30..... 5.00 @ 5.00
Galvanized 31..... 5.50 @ 5.50
Galvanized 32..... 6.00 @ 6.00
American Russia..... 10.00 @ 10.00
Russia..... 10.00 @ 10.00
American Cold Rolled B. B...... 10.00 @ 10.00

Iron Wire.—(See Wire.)
STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb. less 4¢ ad. val.; valued above 4¢ and not above 10¢ per lb., 2¢ per lb.; valued above 10¢ per lb., 3¢ per lb. Extra—Steel Bars, Rods, &c., cold hammered or polished in any way in addition to ordinary hot rolling, 1¢ per lb. in addition to above; Steel Circular Saw Plates, 1¢ per lb. in addition to the above.

American Cast Steel.
For American Steel, see Pittsburgh quotations.

Chrome Steel.
Foot Steel, ordinary sizes, 3/4 to 3 inches, net..... 10 @ 14¢
Adamantine Shoes and Dies..... 14 @ 14¢
Magnet Steel..... 14 @ 14¢

English Steel.
Best Cast..... 10 @ 14¢
Extra Cast..... 10 @ 14¢
Circular Saw Plates..... 10 @ 14¢
Swaged Cast..... 10 @ 14¢
Best Double Shear..... 10 @ 14¢
Blister, 1st quality..... 10 @ 14¢
German Steel, Best..... 10 @ 14¢
3d quality..... 10 @ 14¢
sheet Cast Steel, 1st quality..... 10 @ 14¢
2d quality..... 10 @ 14¢
3d quality..... 10 @ 14¢

TIN.—Duty: Plates, Sheets, Tagger and Terne, 14¢ per lb.; Bars, Block and Pigs free.

Best Cast...... 10 @ 14¢
Extra Cast..... 10 @ 14¢
Circular Saw Plates..... 10 @ 14¢
Swaged Cast..... 10 @ 14¢
Best Double Shear..... 10 @ 14¢
Blister, 1st quality..... 10 @ 14¢
German Steel, Best..... 10 @ 14¢
3d quality..... 10 @ 14¢
sheet Cast Steel, 1st quality..... 10 @ 14¢
2d quality..... 10 @ 14¢
3d quality..... 10 @ 14¢

Charcoal Tin Plates.
1 C 10x14 225 sheets..... 5.00 @ 5.00
1 C 12x12 225 sheets..... 5.00 @ 5.00
1 C 10x14 112 sheets..... 5.00 @ 5.00
1 C 12x12 112 sheets..... 5.00 @ 5.00
1 C 10x14 225 sheets..... 5.00 @ 5.00
1 C 12x12 225 sheets..... 5.00 @ 5.00
1 C 10x14 112 sheets..... 5.00 @ 5.00
1 C 12x12 112 sheets..... 5.00 @ 5.00

Coke Tin Plates.
Best..... 5.00 @ 5.00
Ordinary..... 4.50 @ 4.50
C 10x14..... 4.50 @ 4.50
C 12x12..... 4.50 @ 4.50
1 C 10x14 225 sheets..... 5.00 @ 5.00
1 C 12x12 225 sheets..... 5.00 @ 5.00
1 C 10x14 112 sheets..... 5.00 @ 5.00
1 C 12x12 112 sheets..... 5.00 @ 5.00

Terne Plates.
Prime Char. 3d quality..... 5.00 @ 5.00
1 C 10x14 M.F. 225 sheets..... 5.00 @ 5.00
1 C 12x12 M.F. 225 sheets..... 5.00 @ 5.00
1 C 10x14 112 sheets..... 5.00 @ 5.00
1 C 12x12 112 sheets..... 5.00 @ 5.00
1 C 10x14 225 sheets..... 5.00 @ 5.00
1 C 12x12 225 sheets..... 5.00 @ 5.00
1 C 10x14 112 sheets..... 5.00 @ 5.00
1 C 12x12 112 sheets..... 5.00 @ 5.00

Tin Boiler Plates.
1 C 10x14 225 sheets for No. 7, 112 sheets..... 12.00 @ 12.00
1 C 12x12 225 sheets..... 12.00 @ 12.00
1 C 10x14 112 sheets..... 12.00 @ 12.00
1 C 12x12 112 sheets..... 12.00 @ 12.00

COPPER.—Duty: Pig, Bar and Ingot, 4¢ Old Copper, 3¢ B. Manufactured (including all articles of which Copper is a component of chief value), 35¢ ad valorem.

Cold Rolled Sheet.
16 oz. per square foot, and heavier..... 21¢ @ 21¢
14 oz. per square foot..... 20¢ @ 20¢
12 and 13 oz. per square foot..... 19¢ @ 19¢
10 and 11 oz. per square foot..... 18¢ @ 18¢

Sheathing Copper. (14 x 48.)
Hot Cold..... 21¢ @ 21¢
Rolled..... 20¢ @ 20¢
16 oz. to sq. ft. and heavier, per lb..... 21¢ @ 21¢
14 oz. and up to 16 oz., per lb..... 20¢ @ 20¢
12 oz. and up to 14 oz., per lb..... 19¢ @ 19¢
Tinning, 6 cents each.

Copper Bottoms.
Pits and Flats, 14 oz..... 21¢ @ 21¢
Pits and Flats, 12 oz..... 20¢ @ 20¢
O'Neill's Patent Planished Copper—Net, 14x48..... 21¢ @ 21¢
14 and 16 oz. and heavier, 27¢ By the case, 21¢ @ 21¢
12 oz. and lighter..... 20¢ @ 20¢

Boiler Sizes.
7 in. 14x52..... 9 in. 14x60..... 21¢ @ 21¢
and 16 oz. and heavier, 27¢ By the case, 21¢ @ 21¢
And all sizes not over 20 in. wide..... 21¢ @ 21¢
and 16 oz. and heavier..... 21¢ @ 21¢
Planished Brass same price as Planished Copper

Copper Wire.—(See Wire.)
Sheathing Metal.
Yellow Sheathing Metal, 20..... 18¢ @ 18¢

BRASS AND GERMAN SILVER.
Room & Sharpe's Gauge the Standard for Wire.
Old English Gauge the Standard for Wire.
Manufacturers' Price List, January 17, 1887..... 10.00 @ 10.00

LEAD.—Duty: Pig, 2¢ 100 lb.; Old Lead, 2¢ 100 lb.; Pipe and Sheet, 3¢ 100 lb.

Pig...... 4¢ @ 4¢
Bar...... 5¢ @ 5¢
Pipe...... 7¢ @ 7¢
Block Tin Pipe...... 15¢ @ 15¢
Tin Lined Pipe...... 15¢ @ 15¢
Sheet...... 73¢ @ 73¢
Shot...... 25¢ @ 25¢
Chilled Shot...... 25¢ @ 25¢

ANTONY.
Hallett's..... 4¢ @ 4¢
Cookson..... 9¢ @ 9¢
100 lbs..... 10¢ @ 10¢

SPELTER.—Duty: Pigs, Bars and Plates, \$1.50 per 100 lbs.
American, cash..... 45¢ @ 45¢
Bergenport..... 45¢ @ 45¢

ZINC.—Duty: Pig or Block, \$1.50 per 100 lbs.
Sheet, 24¢ per lb.
600 lb. casks..... 5.65 @ 5.85
Zinc—Open..... 63¢ @ 63¢
Zinc Tubing..... 10¢ @ 10¢

Zinc Tubing—Dis. 25 s.
Plain..... 27¢ @ 27¢
Fancy..... 30¢ @ 30¢
Scott and Extra Patterns..... 30¢ @ 30¢

SABBITT METAL.
N. P. U..... 6¢ @ 6¢
X..... 10¢ @ 10¢
J. B..... 30¢ @ 30¢

WIRE.
Market Wire.—Put up in 63 lb. bundles.
Nos. 10 to 12, 13, 14, 15, 16, 17, 18..... 10¢ @ 10¢
10 11 12 13 14 15 16 17 18
Bright Market Wire..... 10¢ @ 10¢
Charcoal..... 10¢ @ 10¢
Bale Wire, Nos. 7 to 12..... 10¢ @ 10¢
Annealed Market Wire..... 10¢ @ 10¢
Fence Wire, Nos. 8 and 9..... 10¢ @ 10¢
Grape Wire, Nos. 10 to 14..... 10¢ @ 10¢
Coppered Market Wire..... 10¢ @ 10¢
Bale Wire, Nos. 7 to 12..... 10¢ @ 10¢
Galvanized Market Wire..... 10¢ @ 10¢
Fence Wire..... 10¢ @ 10¢

Stone or Weaving Wire.
Nos. 16 17 18 19 20 21 22 23 24 25 26..... 10¢ @ 10¢
Nos. 27 28 29 30 31 32 33 34 35 36..... 10¢ @ 10¢
Nos. 37 38 39 40 41 42 43 44 45 46..... 10¢ @ 10¢
Nos. 47 48 49 50 51 52 53 54 55 56..... 10¢ @ 10¢
Nos. 57 58 59 60 61 62 63 64 65 66..... 10¢ @ 10¢
Nos. 67 68 69 70 71 72 73 74 75 76..... 10¢ @ 10¢
Nos. 77 78 79 80 81 82 83 84 85 86..... 10¢ @ 10¢
Nos. 87 88 89 90 91 92 93 94 95 96..... 10¢ @ 10¢
Nos. 97 98 99 100 101 102 103 104 105 106..... 10¢ @ 10¢
Nos. 107 108 109 110 111 112 113 114 115 116..... 10¢ @ 10¢
Nos. 117 118 119 120 121 122 123 124 125 126..... 10¢ @ 10¢
Nos. 127 128 129 130 131 132 133 134 135 136..... 10¢ @ 10¢
Nos. 137 138 139 140 141 142 143 144 145 146..... 10¢ @ 10¢
Nos. 147 148 149 150 151 152 153 154 155 156..... 10¢ @ 10¢
Nos. 157 158 159 160 161 162 163 164 165 166..... 10¢ @ 10¢
Nos. 167 168 169 170 171 172 173 174 175 176..... 10¢ @ 10¢
Nos. 177 178 179 180 181 182 183 184 185 186..... 10¢ @ 10¢
Nos. 187 188 189 190 191 192 193 194 195 196..... 10¢ @ 10¢
Nos. 197 198 199 200 201 202 203 204 205 206..... 10¢ @ 10¢
Nos. 207 208 209 210 211 212 213 214 215 216..... 10¢ @ 10¢
Nos. 217 218 219 220 221 222 223 224 225 226..... 10¢ @ 10¢
Nos. 227 228 229 230 231 232 233 234 235 236..... 10¢ @ 10¢
Nos. 237 238 239 240 241 242 243 244 245 246..... 10¢ @ 10¢
Nos. 247 248 249 250 251 252 253 254 255 256..... 10¢ @ 10¢
Nos. 257 258 259 260 261 262 263 264 265 266..... 10¢ @ 10¢
Nos. 267 268 269 270 271 272 273 274 275 276..... 10¢ @ 10¢
Nos. 277 278 279 280 281 282 283 284 285 286..... 10¢ @ 10¢
Nos. 287 288 289 290 291 292 293 294 295 296..... 10¢ @ 10¢
Nos. 297 298 299 300 301 302 303 304 305 306..... 10¢ @ 10¢
Nos. 307 308 309 310 311 312 313 314 315 316..... 10¢ @ 10¢
Nos. 317 318 319 320 321 322 323 324 325 326..... 10¢ @ 10¢
Nos. 327 328 329 330 331 332 333 334 335 336..... 10¢ @ 10¢
Nos. 337 338 339 340 341 342 343 344 345 346..... 10¢ @ 10¢
Nos. 347 348 349 350 351 352 353 354 355 356..... 10¢ @ 10¢
Nos. 357 358 359 360 361 362 363 364 365 366..... 10¢ @ 10¢
Nos. 367 368 369 370 371 372 373 374 375 376..... 10¢ @ 10¢
Nos. 377 378 379 380 381 382 383 384 385 386..... 10¢ @ 10¢
Nos. 387 388 389 390 391 392 393 394 395 396..... 10¢ @ 10¢
Nos. 397 398 399 400 401 402 403 404 405 406..... 10¢ @ 10¢
Nos. 407 408 409 410 411 412 413 414 415 416..... 10¢ @ 10¢
Nos. 417 418 419 420 421 422 423 424 425 426..... 10¢ @ 10¢
Nos. 427 428 429 430 431 432 433 434 435 436..... 10¢ @ 10¢
Nos. 437 438 439 440 441 442 443 444 445 446..... 10¢ @ 10¢
Nos. 447 448 449 450 451 452 453 454 455 456..... 10¢ @ 10¢
Nos. 457 458 459 460 461 462 463 464 465 466..... 10¢ @ 10¢
Nos. 467 468 469 470 471 472 473 474 475 476..... 10¢ @ 10¢
Nos. 477 478 479 480 481 482 483 484 485 486..... 10¢ @ 10¢
Nos. 487 488 489 490 491 492 493 494 495 496..... 10¢ @ 10¢
Nos. 497 498 499 500 501 502 503 504 505 506..... 10¢ @ 10¢
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Nos. 517 518 519 520 521 522 523 524 525 526..... 10¢ @ 10¢
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Nos. 537 538 539 540 541 542 543 544 545 546..... 10¢ @ 10¢
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Nos. 557 558 559 560 561 562 563 564 565 566..... 10¢ @ 10¢
Nos. 567 568 569 570 571 572 573 574 575 576..... 10¢ @ 10¢
Nos. 577 578 579 580 581 582 583 584 585 586..... 10¢ @ 10¢
Nos. 587 588 589 590 591 592 593 594 595 596..... 10¢ @ 10¢
Nos. 597 598 599 600 601 602 603 604 605 606..... 10¢ @ 10¢
Nos. 607 608 609 610 611 612 613 614 615 616..... 10¢ @ 10¢
Nos. 617 618 619 620 621 622 623 624 625 626..... 10¢ @ 10¢
Nos. 627 628 629 630 631 632 633 634 635 636..... 10¢ @ 10¢
Nos. 637 638 639 640 641 642 643 644 645 646..... 10¢ @ 10¢
Nos. 647 648 649 650 651 652 653 654 655 656..... 10¢ @ 10¢
Nos. 657 658 659 660 661 662 663 664 665 666..... 10¢ @ 10¢
Nos. 667 668 669 670 671 672 673 674 675 676..... 10¢ @ 10¢
Nos. 677 678 679 680 681 682 683 684 685 686..... 10¢ @ 10¢
Nos. 687 688 689 690 691 692 693 694 695 696..... 10¢ @ 10¢
Nos. 697 698 699 700 701 702 703 704 705 706..... 10¢ @ 10¢
Nos. 707 708 709 710 711 712 713 714 715 716..... 10¢ @ 10¢
Nos. 717 718 719 720 721 722 723 724 725 726..... 10¢ @ 10¢
Nos. 727 728 729 730 731 732 733 734 735 736..... 10¢ @ 10¢
Nos. 737 738 739 740 741 742 743 744 745 746..... 10¢ @ 10¢
Nos. 747 748 749 750 751 752 753 754 755 756..... 10¢ @ 10¢
Nos. 757 758 759 760 761 762 763 764 765 766..... 10¢ @ 10¢
Nos. 767 768 769 770 771 772 773 774 775 776..... 10¢ @ 10¢
Nos. 777 778 779 780 781 782 783 784 785 786..... 10¢ @ 10¢
Nos. 787 788 789 790 791 792 793 794 795 796..... 10¢ @ 10¢
Nos. 797 798 799 800 801 802 803 804 805 806..... 10¢ @ 10¢
Nos. 807 808 809 810 811 812 813 814 815 816..... 10¢ @ 10¢
Nos. 817 818 819 820 821 822 823 824 825 826..... 10¢ @ 10¢
Nos. 827 828 829 830 831 832 833 834 835 836..... 10¢ @ 10¢
Nos. 837 838 839 840 841 842 843 844 845 846..... 10¢ @ 10¢
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Nos. 857 858 859 860 861 862 863 864 865 866..... 10¢ @ 10¢
Nos. 867 868 869 870 871 872 873 874 875 876..... 10¢ @ 10¢
Nos. 877 878 879 880 881 882 883 884 885 886..... 10¢ @ 10¢
Nos. 887 888 889 890 891 892 893 894 895 896..... 10¢ @ 10¢
Nos. 897 898 899 900 901 902 903 904 905 906..... 10¢ @ 10¢
Nos. 907 908 909 910 911 912 913 914 915 916..... 10¢ @ 10¢
Nos. 917 918 919 920 921 922 923 924 925 926..... 10¢ @ 10¢
Nos. 927 928 929 930 931 932 933 934 935 936..... 10¢ @ 10¢
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Nos. 947 948 949 950 951 952 953 954 955 956..... 10¢ @ 10¢
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Nos. 967 968 969 970 971 972 973 974 975 976..... 10¢ @ 10¢
Nos. 977 978 979 980 981 982 983 984 985 986..... 10¢ @ 10¢
Nos. 987 988 989 990 991 992 993 994 995 996..... 10¢ @ 10¢
Nos. 997 998 999 1000 1001 1002 1003 1004 1005 1006..... 10¢ @ 10¢
Nos. 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016..... 10¢ @ 10¢
Nos. 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026..... 10¢ @ 10¢
Nos. 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036..... 10¢ @ 10¢
Nos. 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046..... 10¢ @ 10¢
Nos. 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056..... 10¢ @ 10¢
Nos. 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066..... 10¢ @ 10¢
Nos. 1067 1068 1069 1070 1071 1072 1073 1074 1075 1076..... 10¢ @ 10¢
Nos. 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086..... 10¢ @ 10¢
Nos. 1087 1088 1089 1090 1091 1092 1093 1094 1095 1096..... 10¢ @ 10¢
Nos. 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106..... 10¢ @ 10¢
Nos. 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116..... 10¢ @ 10¢
Nos. 1117 1118 1119 1120 1121 1122 1123 1124 1125 1126..... 10¢ @ 10¢
Nos. 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136..... 10¢ @ 10¢
Nos. 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146..... 10¢ @ 10¢
Nos. 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156..... 10¢ @ 10¢
Nos. 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166..... 10¢ @ 10¢
Nos. 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176..... 10¢ @ 10¢
Nos. 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186..... 10¢ @ 10¢
Nos. 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196..... 10¢ @ 10¢
Nos. 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206..... 10¢ @ 10¢
Nos. 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216..... 10¢ @ 10¢
Nos. 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226..... 10¢ @ 10¢
Nos. 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236..... 10¢ @ 10¢
Nos. 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246..... 10¢ @ 10¢
Nos. 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256..... 10¢ @ 10¢
Nos. 1

thereon; the cost and value of the carrier's property, franchises and equipment; the number of employees, and the salary paid each class; the amounts expended for improvements each year, how expended, and the character of such improvements; the earnings and receipts from each branch of business and from all sources; the operating and other expenses; the balances of profit and loss, and a complete exhibit of financial operations of the carrier each year, including an annual balance-sheet. Such reports shall also contain such information in relation to rates or regulations, concerning

removed, first, by placing the hammer entirely within the lock frame so that no external force whatever can be applied to it, and, secondly, by so arranging the trigger that it cannot be pulled except at the instant of deliberate firing, and only by this means. Another very important feature in this arrangement is the safety of the arm in the hands of children, as no ordinary child under eight years of age can discharge it, as the safety lever and trigger must operate in conjunction. The manufacturers claim that one of these revolvers may be carried with as little danger of injury to the person



Smith & Wesson's Hammerless Safety Revolver.

fares or freights, or agreements, arrangements or contracts with other common carriers, as the commission may require; and the said commission may, within its discretion, for the purpose of enabling it the better to carry out the purposes of this act, prescribe (if in the opinion of the commission it is practicable to prescribe such uniformity and methods of keeping accounts) a period of time within which all common carriers subject to the provisions of this act shall have, as near as may be, a uniform system of accounts, and the manner in which such accounts shall be kept.

Sec. 21. That the commission shall, on or before the 1st day of December in each year, make a report to the Secretary of the Interior, which shall be by him transmitted to Congress, and copies of which shall be distributed as are the other reports issued from the Interior Department. This report shall contain such information and data collected by the commission as may be considered of value in the determination of questions connected with the regulation of commerce, together with such recommendations as to additional legislation relating thereto as the commission may deem necessary.

Sec. 22.—That nothing in this act shall apply to the carriage, storage or handling of property free or at reduced rates for the United States, State or municipal governments, or for charitable purposes, or to or from fairs and expositions for exhibition thereof, or the issuance of mileage, excursion or commutation passenger tickets; nothing in this act shall be construed to prohibit any common carrier from giving reduced rates to ministers of religion; nothing in this act shall be construed to prevent railroads from giving free carriage to their own officers and employees, or to prevent the principal officers of any railroad company or companies from exchanging passes or tickets with other railroad companies for their officers and employees; and nothing in this act contained shall in any way abridge or alter the remedies now existing at common law or by statute, but the provisions of this act are in addition to such remedies: *Provided*—That no pending litigation shall in any way be affected by this act.

Sec. 23. That the sum of \$100,000 is hereby appropriated for the use and purposes of this act for the fiscal year ending Administration, June 30, A.D. 1888, and the intervening time anterior thereto.

Sec. 24. That the provisions of sections 11 and 18 of this act, relating to the appointment and organization of the commission herein provided for, shall take effect immediately, and the remaining provisions of this act shall take effect 60 days after its passage.

A New Smith & Wesson Revolver.

Smith & Wesson, Springfield, Mass., are putting on the market their new hammerless safety revolver, which is represented in their advertisement on page 40, and also in the accompanying illustration, which shows its special features and the mechanism by which it is operated. Referring to the illustration, A is the safety lever, B safety latch, C hammer, D trigger, E main spring, G safety latch spring. The hammer C which is acted upon and raised by the trigger D, as in their self-cocking arms, is kept constantly locked by the safety latch B, which is held in position by the safety latch spring G. The point is emphasized that when not in use the arm cannot be discharged, as will be seen from the arrangement of the parts. When held in the hand for firing the natural pressure exerted by the hand in the movement of pulling the trigger upon the safety lever A causes it to act upon the safety latch B, raising it and releasing the hammer. No special effort is required to bring the safety lever into action, as the act of holding the pistol in the hand and pulling the trigger is sufficient to operate it. The manner in which this revolver, the invention of D. R. Wesson, of the firm that manufacture it, obviates the liability to accidental discharge, which is a serious objection to revolvers as heretofore made, is a point on which special emphasis is laid. The large proportion of such accidents arise from an unintentional manipulation of the hammer, as it receives a blow, is allowed to slip off the thumb in cocking, is accidentally caught upon some foreign object and partially raised, or is unintentionally left at full cock. It is pointed out by the manufacturers that, in this hammerless safety revolver, these liabilities to accident are

carrying it as if they had a block of wood, while as a weapon of defense on the hammerless, it can readily be taken from the pocket. It weighs but $\frac{1}{2}$ ounce more than their double-action model of the same caliber, and is as handsome in appearance as any pistol they have made. In addition to the features mentioned above, the revolver has the automatic ejector which has been applied to their former models. It is at present made in 38 caliber, the 32 and 44 calibers being now in process of construction.

Amidon's Eclipse Ratchet Brace.

Amidon & White, Buffalo, N. Y., have recently put on the market the article named above, the construction and special features of which are illustrated in the accompanying cuts, Fig. 1 giving a general view of the brace, and Fig. 2 giving sectional views, showing the arrangement of the ratchet. The chuck that holds the bit is connected with a ratchet-wheel, to control which there are two dogs, as shown in the smaller sectional cuts, Fig. 2. These dogs are operated by a spiral spring terminated with a pressure-block which keeps them in



Fig. 1.—Amidon's Eclipse Ratchet Brace.

the desired position, causing them either to press on the ratchet-wheel, or holding one of them back from it. One of the sectional views, Fig. 2, shows them both pressing against the ratchet-wheel, thus making it immovable, and rendering the brace suitable for use where the ratchet feature is not desired. One or other of the dogs can be withdrawn from the ratchet-wheel, as shown in Fig. 2, when the brace is a right or left hand ratchet brace, according as it may be



Fig. 2.—Sectional Views.

set. When one of the dogs is thus drawn back, it will be observed that it is held back by the action of the spring above referred to. This adjustment of the dogs is obviously easily made by the thumb or finger of the operator. The manufacturers call attention to the advantage there is in having the dogs stand back of the ratchet-wheel instead of at the side, as in other braces, making it, it is claimed, much stronger. They also allude to its simplicity, and the fact that it has no objectionable projections that can interfere with its use. This article is put on the market with special claims as to its desirability. It is made with 8, 10, 12 and 14-inch sweep.

Adjustable Bottom Foundry Riddle.

W. S. Estey, 71 Fulton street, New York, has recently put on the market the S T Patent Adjustable Bottom Foundry Riddle, which is illustrated in the accompanying cuts, Fig. 1 showing the riddle complete, and Fig. 2 representing the parts of which it is composed, and indicating the manner in which they are put together. This riddle is offered in view of the fact that the rim on an ordinary foundry riddle outwards the bottom, and to avoid the necessity of sending the old rim to the factory to be repaired or of throwing it away, and purchasing a new one. As implied in the name, and indicated in Fig. 2, adjustable bottoms

are made, with mesh of different sizes, so as to be used interchangeably or to be replaced when worn out. These bottoms are made of a heavy grade of wire cloth, the edges turned over and bound with metal. The rims are stated to be made of the best stock of oak, and iron clamps passing around

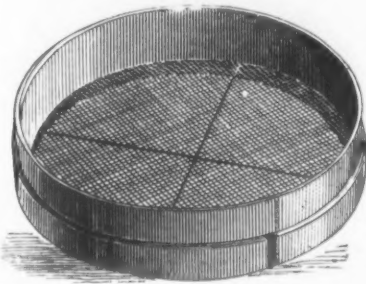


Fig. 1.—Adjustable Bottom Foundry Riddle.

clamp the lining and back hoops to prevent them from splitting or giving way. The manner in which the riddle is put together will be readily apprehended from the cuts without detailed explanation. In addition to the advantages possessed by these riddles on the score of economy, from the fact that worn out bottoms can be replaced at much less expense than new riddles can be pur-

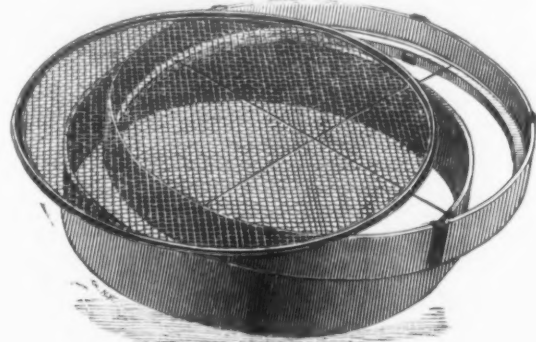


Fig. 2.—Adjustable Bottom Foundry Riddle, with Separate Parts

chased, the further point is made in their favor that the convenience of accommodating the necessary assortment of riddles is materially increased.

The Every-Day Power Meat-Chopper.

M. L. Edwards Mfg. Company, Salem, Ohio, are putting on the market the above-named new meat-chopper, calling attention



to it as simple and complete in construction, durable, cleanly, convenient and chopping rapidly. In its construction a straight shaft is arranged under the block, and near the base of each leg of the machine. To each end of this shaft a fly-wheel is keyed, all of which are operated by a counter-shaft at right angles thereto, and on which a tight and loose pulley are stationed, 15 inches in

each fly-wheel and cross-head. The fly-wheels being secured to the main shaft at each side of the chopper, both ends of each knife have the same positive motion and their entire length carried squarely to the block at each revolution of the fly-wheels. By this arrangement it is claimed that all objectionable springing of the working parts usually known to meat choppers, is avoided. The block rests on rollers and is 10 inches deep, and has an intermittent rotary motion, and revolves only when the knives are above the meat. In the construction of the Every-Day, it will be noticed its mechanism necessary to be oiled is under and at the sides of the chopper, thereby avoiding any possibility of oil dripping into the meat. This feature, as well as the combined advantages of the Every-Day are alluded to as important. The claim is made that it will chop as much meat at a time, and do it as well and as quickly, as any chopper made having the same sized block. It should be run at a speed of 250 to 300 revolutions per minute. It is made in two sizes, Nos. 20 to 25, having respectively blocks 36 and 36 inches in diameter. No. 25 weighs about 1500 pounds.

Our Production of Pig Iron in 1886

The American Iron and Steel Association have received from the manufacturers complete statistics of the production of pig iron

in the United States in the last six months of 1886.

Our production of pig iron in the last six months of 1886 amounted to 3,412,479 net tons of 2000 pounds, or 3,046,856 gross tons of 2240 pounds. Our production in the first six months of 1886 was 2,954,209 net tons, or 2,637,687 gross tons. The increase in the last six months was 458,270 net tons, equal to 409,169 gross tons, or 15 per cent. The production in the last four half years was as follows, in both net and gross tons:

	Net tons.	Gross tons.
First half of 1885.....	2,150,816	1,930,372
Last half of 1885.....	2,379,053	2,124,154
First half of 1886.....	2,954,209	2,637,687
Last half of 1886.....	3,412,479	3,046,856

The total production of pig iron in the United States in 1886 was 6,366,688 net tons, or 5,684,543 gross tons. The total production in 1885 was 4,529,869 net tons, or 4,044,526 gross tons. The increase in 1886 was 1,836,819 net tons, or over 40 per cent. At first sight it would seem that such extraordinary progress in the manufacture of pig iron in this country could never before have been made in one year, but our statistics show that we made virtually as great progress in the boom year 1880, when we made 3,835,191 gross tons, which was an increase of 1,093,338 gross tons over the production of 2,741,853 gross tons in 1879, or nearly 40 per cent. This is a remarkable coincidence. It may as well be confessed now that 1886 was itself a boom year like 1880, with this difference, however, that our people "lost their heads" in 1880 and kept them in 1886. The production of pig iron in this country in each year from 1880 to 1886 was as follows, in both net and gross tons:

Years.	Net tons.	Gross tons.
1880.....	4,295,414	3,835,191
1881.....	4,641,564	4,144,254



The Every-Day Power Meat Chopper.

	1882.....	1883.....	1884.....	1885.....	1886.....
Fuel used.....	2,544,749	2,675,685	3,896,174	3,896,174	3,896,174
Anthracite.....	1,596,453	1,454,300	2,099,597	2,099,597	2,099,597
Charcoal.....	458,418	399,844	460,917	460,917	460,917

Our production of pig iron in 1886, classified according to the fuel used, was as follows, in net tons, compared with the production in 1884 and 1885:

	1884.....	1885.....	1886.....
Fuel used.....	2,544,749	2,675,685	3,896,174
Anthracite.....	1,596,453	1,454,300	2,099,597
Charcoal.....	458,418	399,844	460,917

The anthracite figures include all pig iron

made with mixed anthracite and coke, as well as that made with anthracite alone. In 1886 the total quantity of pig iron made with anthracite alone was only 443,746 net tons.

There was a gratifying increase in our production of spiegel-eisen in 1886, which is included in the figures of total production of pig iron. We made 47,982 net tons in 1886, against 34,671 tons in 1885. Only New Jersey and Pennsylvania made spiegel-eisen in 1885, but in 1886 Colorado made 932 net tons in addition to the production of the two other States mentioned.

The gain in production in the last six months of 1886 over the first six months was chiefly in Pennsylvania and Illinois. The total gain in the country at large was 458,270 net tons, and to this gain Pennsylvania and Illinois jointly contributed 320,238 net tons. The great activity in the manufacture of Bessemer steel in these two States in the last half of the year mainly accounts for their increased production of pig iron. Allegheny County, Pa., which is the leading pig-iron district in the country, produced about 135,000 net tons in the last half of 1886 more than in the first half.

Ten Southern States, Missouri included, contrary to the general impression, did not greatly increase their production in the last half over the first half of 1886, the increase being only 63,742 net tons. The increase would have been larger but for the time lost in remodeling two large coke furnaces, belonging respectively to the Alice and Sloss companies in Alabama. In the whole year 1886 these Southern States made a gain of 186,819 net tons over 1885, the production in 1885 being 764,243 tons, and in 1886 being 951,062 tons. The increase in 1886 was 24 per cent. Here, again, the general expectation concerning the growth of the Southern pig-iron industry has not been fully realized, the increase in the whole country in 1886 over 1885 being 40 per cent. It may be said, however, that 1886 was a year of preparation in the South more than of realization.

Every State which produced pig iron in 1885 increased its production in 1886, except Virginia and Oregon. The decline in Virginia was very slight, and was almost wholly in charcoal pig iron. Pennsylvania shows a great increase, and so does Ohio. Pennsylvania made in 1886 over 50 per cent. of the country's total production of pig iron.

The stocks of domestic pig iron on hand and unsold in the hands of manufacturers or their agents on the 31st of December, 1886, aggregated only 249,504 net tons. At the close of 1885 they amounted to 416,512 net tons. Low as the stocks were at the close of 1886, our statistics show that they have been lower at the close of two recent years. At the close of 1879 they amounted to 141,674 net tons, and at the close of 1881 they amounted to 210,896 net tons. Our statistics of stocks unsold do not include pig iron sold in the hands of speculators, brokers or creditors.—*Bulletin*.

We have added below the production of the different States according to fuel, converting Mr. Swank's figures into gross tons:

	First half 1886.	Second half 1886.	Total 1886.
New York.....	99,845	95,904	195,749
New Jersey.....	70,637	70,398	141,035
Pennsylvania:			
Lehigh Valley.....	286,221	308,369	594,590
Schuylkill Valley.....	153,261	198,118	351,379
Upper Susquehanna.....	75,506	65,672	141,178
Lower Susquehanna.....	27,864	27,864	55,728
Maryland.....	6,362	9,571	15,933
Maryland.....	2,222	2,222	4,444
Total.....	908,354	971,285	1,879,639

Estimated Production of Bituminous and Coke Pig in 1886, Gross tons.

	First half 1886.	Second half 1886.	Total 1886.
Pennsylvania:			
Allegheny County.....	268,762	308,369	577,131
Shenango Valley.....	163,309	183,870	347,179
Miscellaneous.....	336,143	187,484	523,627
Maryland.....	6,362	9,571	15,933
Virginia.....	61,314	72,776	134,090
Georgia.....	19,848	21,251	41,099
Alabama.....	96,867	98,306	195,173
Tennessee.....	74,718	78,643	153,361
West Virginia.....	44,000	45,452	89,452
Kentucky.....	16,988	27,198	44,186
Ohio:			
Mahoning Valley.....	159,845	152,814	312,659
Hocking Valley.....	27,074	24,590	51,664
Hanging Rock.....	45,180	58,747	103,927
Miscellaneous.....	149,284	178,832	328,116
Indiana.....	9,797	5,079	14,876
Illinois.....	174,669	273,362	448,031
Wisconsin.....	15,128	18,395	33,523
Missouri.....	20,607	27,916	48,523
Colorado.....	9,323	9,323	18,646
Total.....	1,558,536	1,839,833	3,398,369

Out of a total production of 411,533 gross tons of charcoal pig in 1886, Alabama made 73,312 tons and Michigan 170,293 gross tons.

An Experiment in Profit Sharing.

Mr. N. O. Nelson, the head of the N. O. Nelson Mfg. Company, of St. Louis, thinks he has solved the labor and capital trouble. His plan is profit-sharing. Mr. Nelson's firm employ something over a hundred men in his mill machinery factory, and with a view of avoiding trouble for all time with his men, he made a tour of this country and then crossed the ocean, prosecuting inquiries into the wage question. After obtaining all information possible on the subject, he last March inaugurated the profit-sharing system in his establishment. His plan was that the men should work 55 hours a week, receive the same wages they had been getting, and, after allowing 7 per cent. on capital invested and a salary for his services, the profits at the end of the year were to be divided between the firm and the workmen on the basis of total wages paid and capital invested. A short time ago the employees requested the restoration of 10 hours a day. The company has just declared a dividend, the employees getting 5 per cent. on their wages and the proprietors a corresponding amount on capital. The scheme involves, besides these features already related, a relief and insurance fund, and a surplus fund to be set aside for years when business is bad. It looks like a great success.

The stockholders of the St. Louis Smelting and Refining Company, of St. Louis, have elected the following directors to serve during the ensuing year: G. W. Chadbourne, James W. Bell, J. C. Van Blarcom, G. H. Loker, W. H. Thompson.

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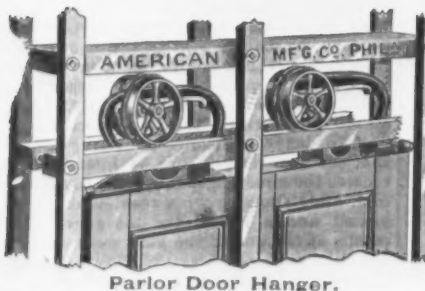
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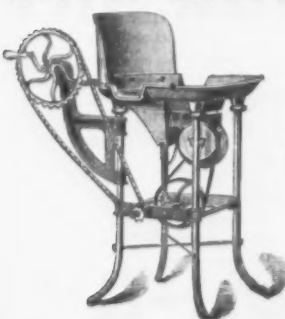
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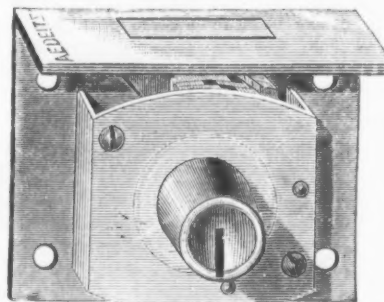
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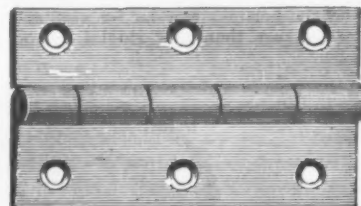
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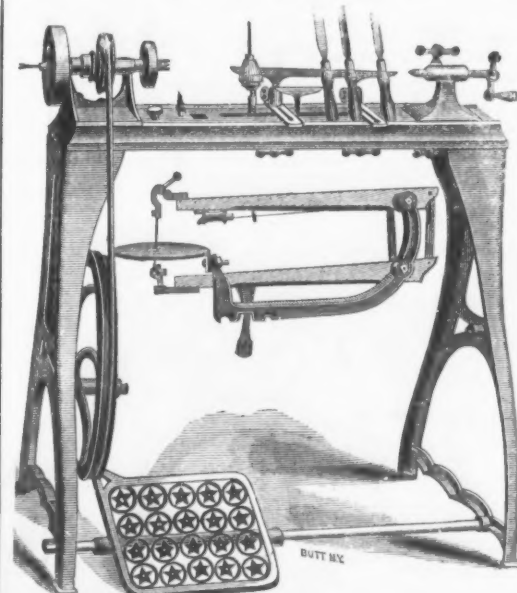


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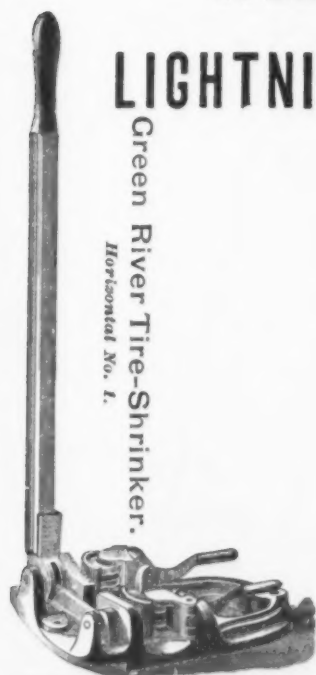
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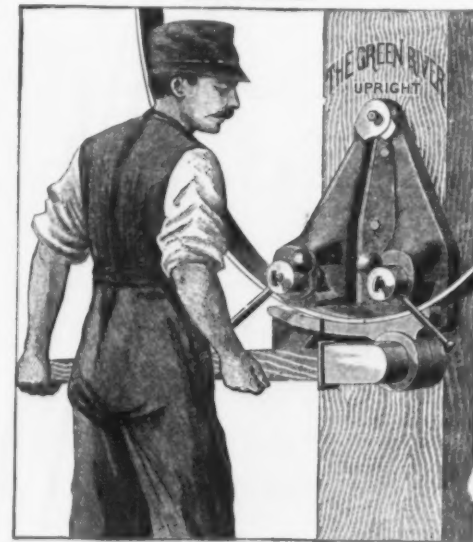


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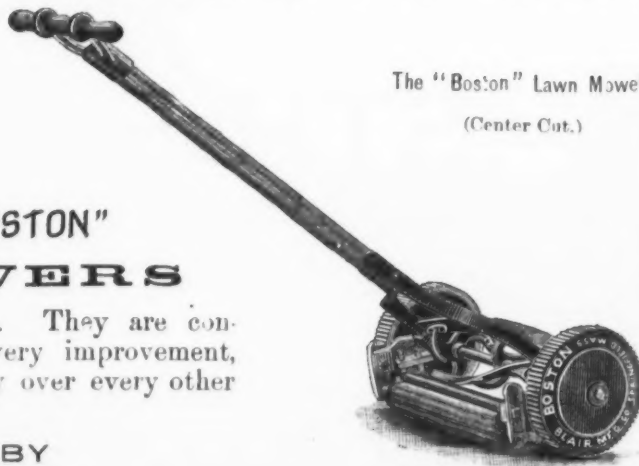
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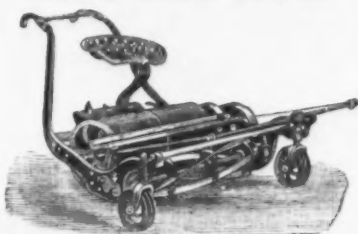
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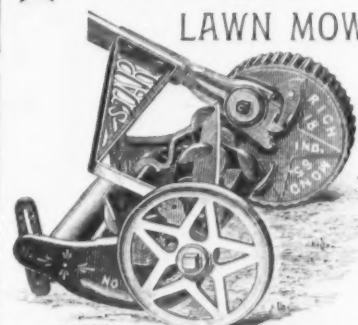
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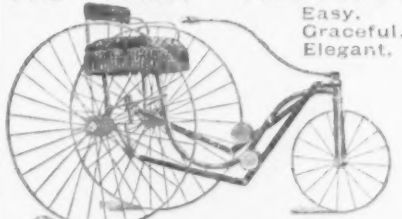
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J. T. Williams, Gen'l Man.,

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Wholesale and Retail Dealers in

Soddy and Sale Creek
Coal and Coke,

OFFICE: Market Bet. 4th and 5th Sts.

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MANUFACTURERS OF

FIRE BRICK.

Vitrified, Salt-Glazed

SEWER PIPE.

RAILROAD CULVERT PIPE

(DOUBLE STRENGTH).

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Square, Soap, Split, Arch, Key and Cupola Brick in store, and quotations and freight rates given in car load lots to Blast Furnaces, Rolling Mills, Foundries, &c. These brick also are adapted for Gas Companies, Boiler Settings, Coal Grates and all purposes where a superior quality of Fire Brick are desired.

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IMPORTERS AND JOBBERS OF

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HOWE SCALES, KING'S POWDER, ATLANTIC DYNAMITE,

Market and Seventh Sts., Chattanooga, Tenn.

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Manufacturers and Dealers in

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OF ALL KINDS.

Special attention given to the Repairing of all kinds of saws.
Liberal discounts to the hardware trade. Write for prices.

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READING IRON WORKS, Wrought Iron Pipe, Plain and Galvanized.
ETNA FIRE BRICK WORKS, for Furnace Boshes, Hearths, Linings, Heating Furnaces,
Cupolas, &c.

SAGENDORPH ROOFING AND PAINT CO., Standing Seam, V Crimp and Corrugated
Iron Roofing.

DILWORTH, PORTER & CO., Railroad and Boat Spikes.

OLIVER BROS. & PHILLIPS, Track, Bridge and Car Bolts, and Steel Car Links and
Pins.

Also dealers in Pig Iron, Foundry Coke, Light Rails, &c.

STONE & EWING,
Steel Rails, R. R. Spikes,

TRACK BOLTS,
Angle Bars, &c.

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IRON AND BRASS CASTINGS,

CRESTING OF ALL KINDS,

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MADE TO ORDER.

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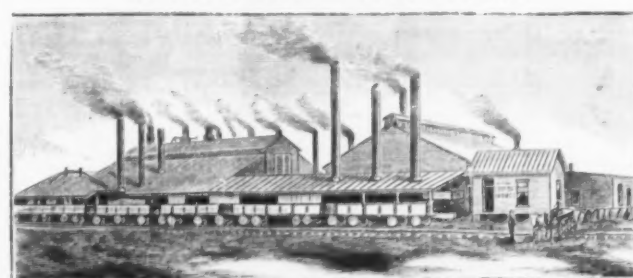
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OF SUPERIOR QUALITY AND FINISH.

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True to Pattern and of Requisite Strength. Carefully Inspected,
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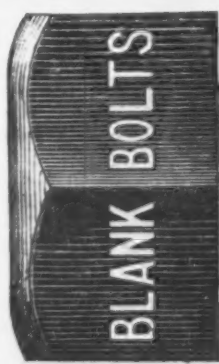
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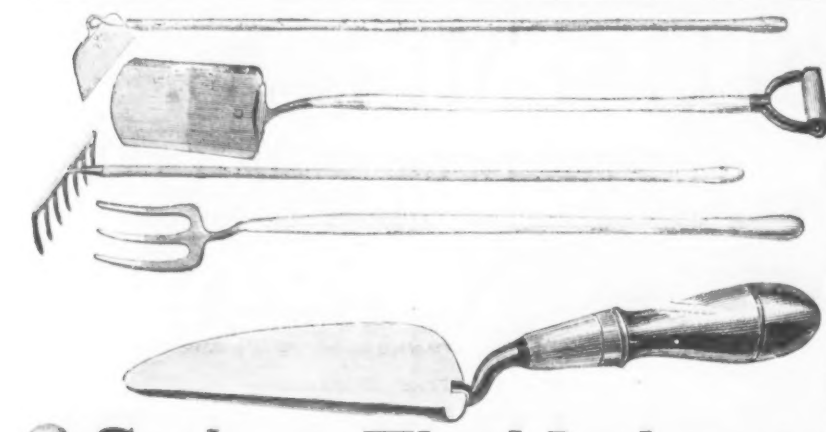
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Coultaus' Patent.
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Medal of Merit Awarded by the American Institute, New York, 1884.

The door is held in any desired position by the pressure of the roller on the floor, making it a most useful article for dwelling houses, offices, stores, hotels, railroad cars, hospitals, etc., and doing away with the hooks, chains, wedges, bricks, etc., ordinarily used for this purpose. The rubber covering to the roller does no injury to carpets or oil cloths, and by simply lifting the handle the spring can be thrown out of use when desired. If the holders are required to operate against very strong springs or winds, it should be so stated when ordering.

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FOR WET AND DRY LEATHER BELTING.



THE STANDARD BELT OIL
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In their Treatise on Machine Belting, FAYERWEATHER & LADEN, successors to J. B. HOYT & CO., speak of Post's Oil as follows:

OILING OF BELTS.
"Care should be taken that belts are kept soft and pliable. For this purpose we decidedly advise the use of 'POST'S WATER-PROOF BELT OIL AND LEATHER PRESERVATIVE.' When applied as directed it makes the Belts smooth, pliable and adhesive, and causes it to hug the pulley closely, so that no power is lost from lack of pulley contact. It possesses excellent preservative qualities and also renders the leather more impervious to dampness than any article or preparation we know of."
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This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

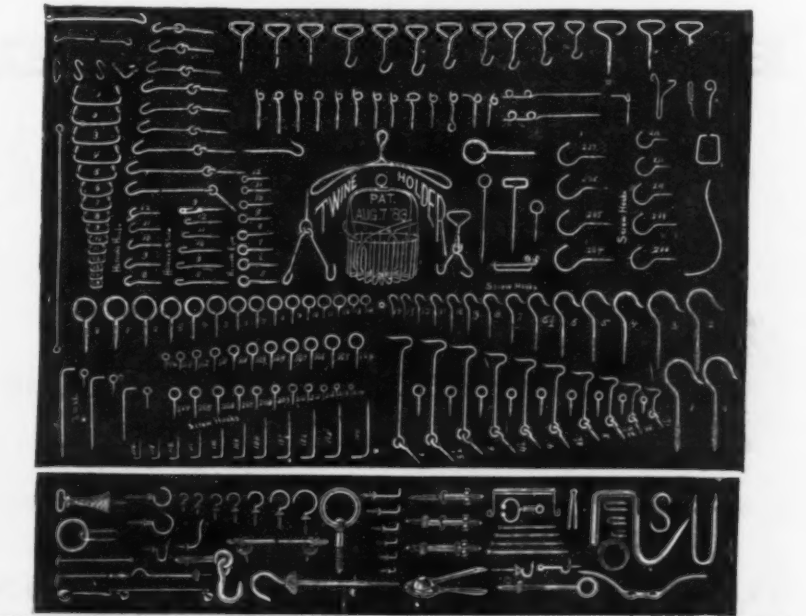
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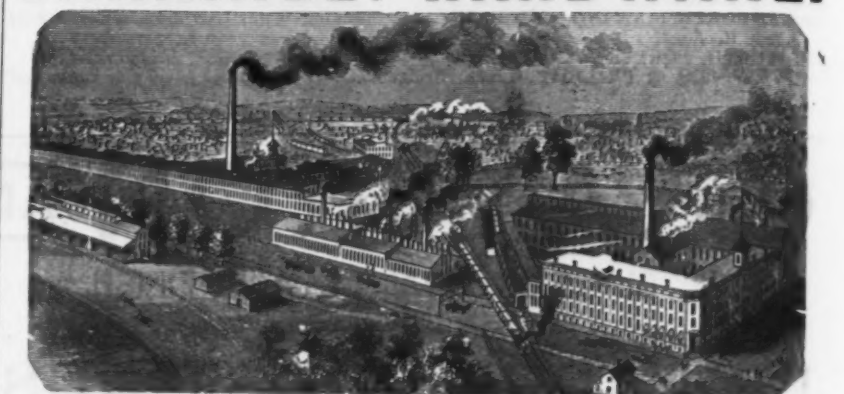
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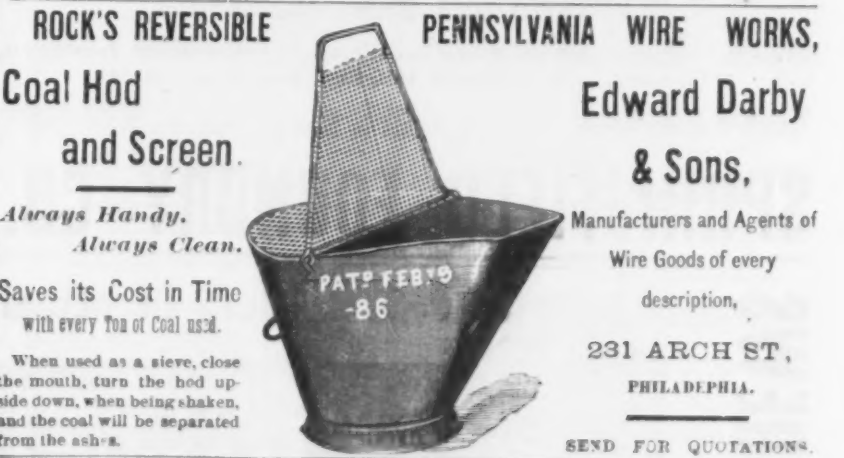
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Always Handy. Always Clean.
Saves its Cost in Time with every Ton of Coal used.
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STEAM, WATER, GAS, AMMONIA.

GATE FIRE HYDRANTS,

With and Without Independent Nozzle Valves.

Valves and Hydrants made with Babbitt Metal Seats and non-corrosive working parts.

ALL WORK GUARANTEED.

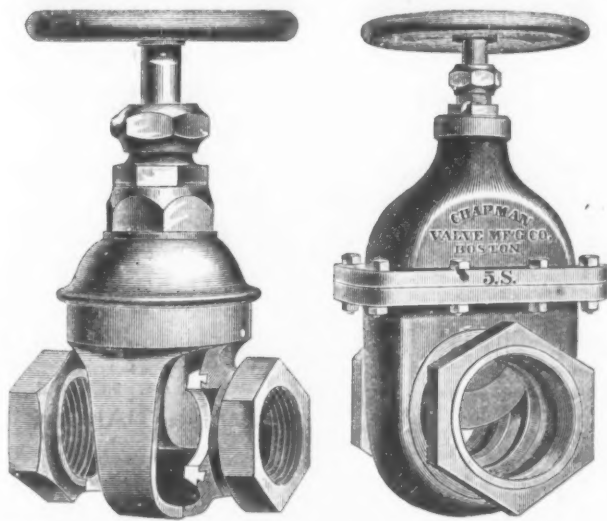
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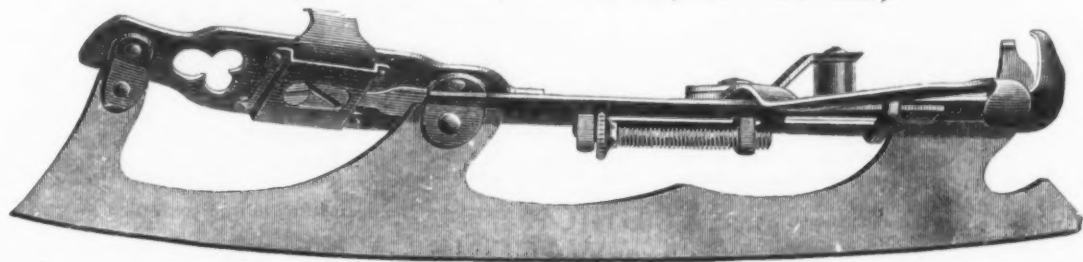


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ELECTRO-PLATERS in Gold, Silver, Nickel and Brass.

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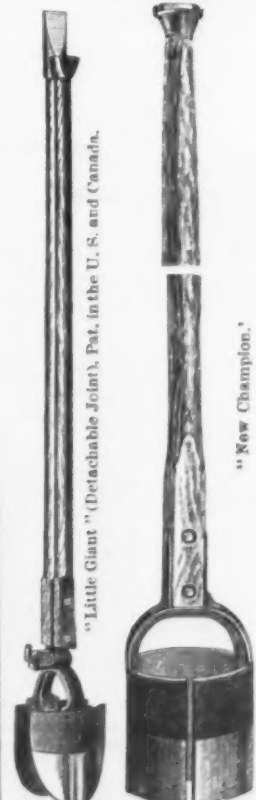
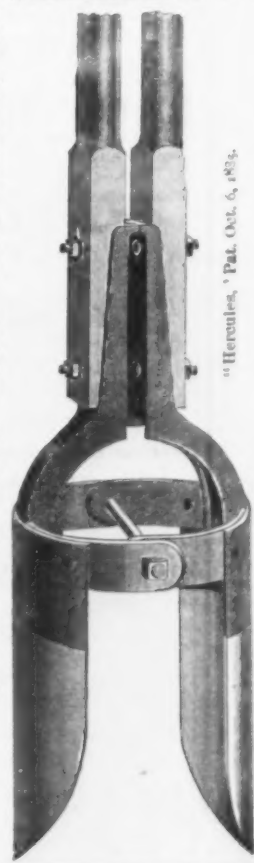
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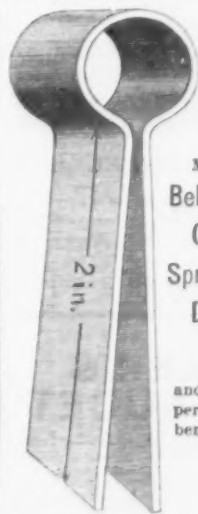
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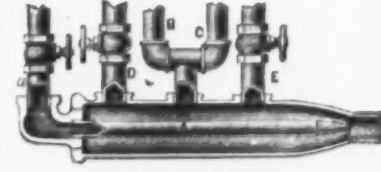
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Will stop all snapping and cracking noises in steam pipes; in rooms heat in cry rooms. The only fitting in the world that will do it. It is worked by steam after passing through the heaters.

McDANIEL'S PATENT EXHAUST-PIPE HEAD

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McDaniel's Patent Suction Tee will make all bad steam connections work perfectly; no backing up on one another; no noise; all radiators should be connected with it.

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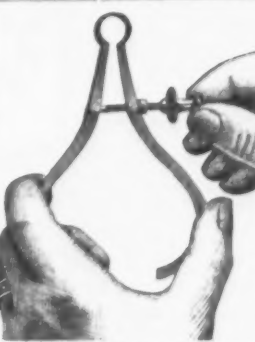
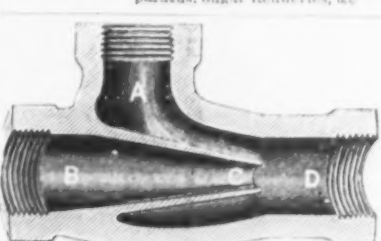
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SEND FOR ILLUSTRATED PRICE LIST.

SPECIAL WIRES FOR MANUFACTURING PURPOSES ON ANY SIZE OF SPOOL.

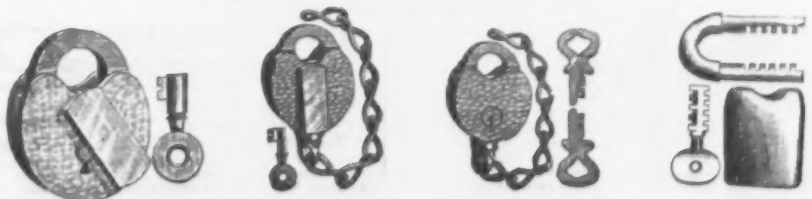
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PADLOCKS,

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BEST QUALITY. LARGE VARIETY.

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WHEN IN CHICAGO WILL PLEASE NOTICE THAT WE CON-
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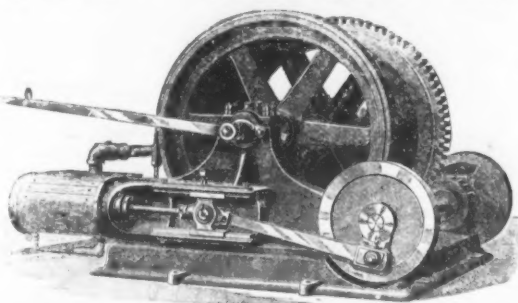
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Mines,
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Possible Duty.



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Complete Hoisting and Mining Plants a Specialty.
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POWELL TOOL CO.'S BRANDS OF AXES,
"Peerless," "Monarch" and "Old Hickory."

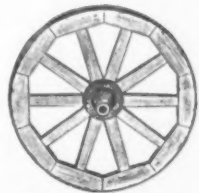
FINEST QUALITY, SUREST TEMPER AND BEST MADE.
SEE THAT OUR STAMP IS IN THE HEAD OF EACH
AXE. IT IS A GUARANTEE OF
A 1 QUALITY.

All-Steel Axes, Hatchets and Adzes. Peerless Broad-
Axes the Best in the World.
Boys' Axes, Hunters' Hatchets, Bush Hooks, &c.,
of the Finest Quality.

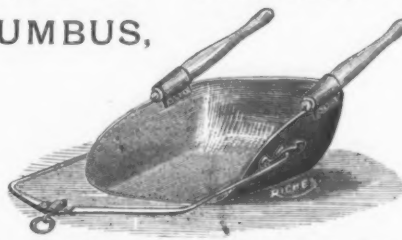
SEND FOR CATALOGUE.

POWELL TOOL CO., Cleveland, O., U. S. A.

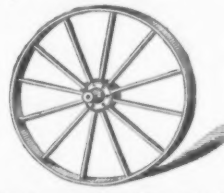
THE KILBOURNE & JACOBS MFG. COMPANY, COLUMBUS, OHIO, U. S. A.



Jacobs' Patent Wood Wheel.



"Columbus" Solid Steel Scrapers.



Jacobs' Patent Steel Spoke Wheel.

Is pressed from one solid sheet of heavy steel, and is the strongest and most durable Road Scraper made. No. 2, 3 cubic feet of earth. No. 3, 1 1/2 cubic feet of earth. out solid steel shoes or runners, as desired. We also furnish these Scrapers with end gates when so desired. The balls are of refined iron, with strong and perfect working swivels. Bowls nest and handles crate compactly for shipment.



RAILROAD OR CANAL BARROW.

With Jacobs' Patent Wood Wheel. Bent Tray, full sized, planed and well finished.



RAILROAD OR CANAL BARROW.

Same as above, except with Jacobs' Patent Steel Spoke Wheel.



ORE OR MORTAR BARROW.

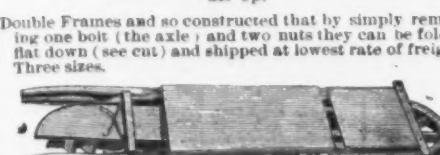
With Jacobs' Patent Wood Wheel. All hardwood. Bowl dovetailed together and firmly nailed.



GARDEN OR FARM BARROW.

Set Up.

Double Frames and so constructed that by simply removing one bolt (the axle) and two nuts they can be folded flat down (see cut) and shipped at lowest rate of freight. Three sizes.



Folded for Shipping.



THE "K. & J." WHEEL SCRAPER.

The Bow or Box is made of the Best Steel Plate, 3-16ths of an inch thick. The Tongue Braces or Bail Lever and Hangers are all of Steel. Narrow patent wheels. These Scrapers have no wood parts to rot or castings to break, no ratchets to clog up, and fewer nuts to come off and parts to get out of order than any other Wheel Scraper. They are so constructed that the team does most of the lifting, and One Man can fill, raise and dump the largest size with ease. They are so hung that there is absolutely NO STRAIN WHATSOEVER ON THE HORSES' NECKS.

No. 2, Capacity 12 cubic feet. No. 3, Capacity 16 cubic feet.

ASK FOR JOHN SOMMER'S BEST BLOCK TIN KEY FAUCETS.

Maple Wood Bod. Highly Polished, with Leather Lining. For Sale in every City by the leading Jobbing Trade.

This celebrated Faucet is equalled by none. The only standard Faucet suit-
able to use for Wine, Liquors, Beer, Ale or Vinegar, which will not form verdigris. They are put through a patent process which makes them impervious.

Beware of imitations, such as keys made of lead, iron and other inferior metals, nickled, which will in every instance form poisonous metallic corrosion. None genuine unless stamped thus: John Sommer's Best Block Tin Key.

World known John Sommer's First Quality Cork-Lined Faucets, all labeled with the name. Everything in the Wood Faucet Line.

Diamond Lock Faucets, Rosewood Faucets with Block Tin Key, Rosewood Faucets, all wood, Maple Wood Faucets, all wood, Lignumvitae Key Faucets, Cherry Faucets, Butter-nut, Black Walnut, Locust and Red Cedar Faucets.

John Sommer's Son, 8, 10 and 12 Pearl St., Newark, N. J.

We will send sample dozen of Barrel Size to any one in the trade, express prepaid, for \$4.00, with sample Card of different sizes.

THE DETROIT SIGHT FEED LUBRICATORS

are pronounced the best by more than 20,000 users. Simple in operation and always reliable. A Lubricator sent on 30 days' trial to responsible parties. "I would not take five times the cost of my Lubricator if I could not get another." is the statement often made by users. Liberal discount to the trade. Send for circular and price list.

DETROIT LUBRICATOR CO.
126 Griswold St., Detroit, Mich.

"THE DETECTIVE Burglar Alarm."

Patented in this and other Countries

May be applied to any door or window in a few seconds. When the door is opened or the window raised the Alarm falls to the floor, exploding a No. 32 blank cartridge.

Packed complete with four cartridges, weight 6 ounces. Endorsed by Hon. Wm. R. Smith, Mayor of Philadelphia, and Gen. James A. Stewart, Chief of Police.

Having improved the Alarm and are now manufacturing them in large quantities, we are prepared to quote lower prices than heretofore—viz., \$1.50 per dozen, or \$15.00 per gross; no charge for boxing or cartage.

Sample sent by mail on receipt of six cents. We furnish handsome gilt signs and frames with every order.

110 Gross sold in the past year.

Owned and Manufactured by

Spencer E. Carr & Co.,

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LAFLIN & RAND POWDER CO.,

No. 29 Murray Street, New York,

Manufacture and sell the following celebrated brands of Sporting powder, known everywhere as

Orange Lightning, Orange Ducking

Orange Rifle.

More popular than any Powder now in use.

BLASTING POWDER and ELECTRICAL BLASTING APPARATUS. MILITARY POWDER on hand and made to order.

Safety Fuse, Frictional and Platinum Fuses. Pamphlets showing sizes of grain sent free.

Dangler Vapor Torches.

For lighting ROLLING MILLS, FOUNDRIES, MACHINE SHOPS, &c.

100,000 in use throughout the United States is proof of their superiority over other TORCHES.

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LIBERAL DISCOUNT TO THE TRADE.

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CLARK'S DRYING EXHAUST AND Ventilating Fans.

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Satisfaction Guaranteed. Catalogue Free. Box X.

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Contains 700 engravings, illustrating and describing all the practical tools and appliances used in the art of Well Sinking, Diamond Drilling, Pumping, Wind Mills, Artesian Engines, Pumps, &c. We will send this book to any party on receipt of 25c. for mailing.

Expert Well Drillers and Agents Wanted. The American Well Works

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The ACME SHEAR CO.

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Manufacturers of

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The Best and Cheapest in the market. Lamp Trim-
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Crackers &c. Send for price list of specialties.



MANUFACTORY, HOLYOKE, MASS, U. S. A.

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SOLE AGENTS,

SALESROOMS, 84 AND 86 CHAMBERS STREET,

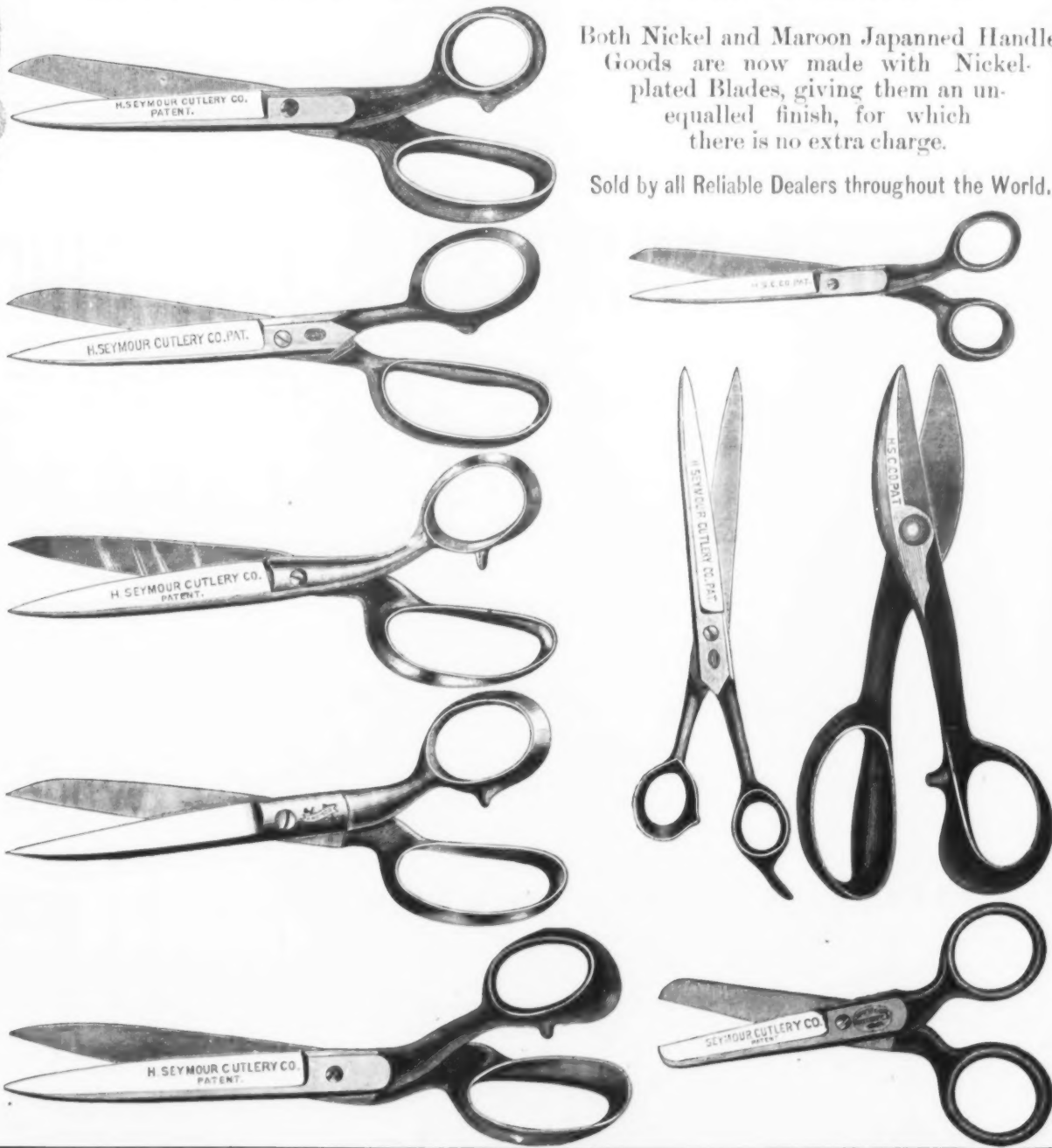
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We are the largest manufacturers and produce the greatest variety.
250 KINDS AND SIZES.

Our quality is unexcelled. All warranted. Send for Price Lists and Discounts.

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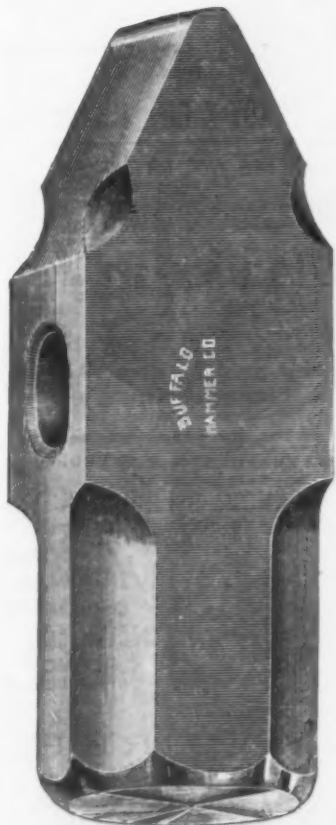
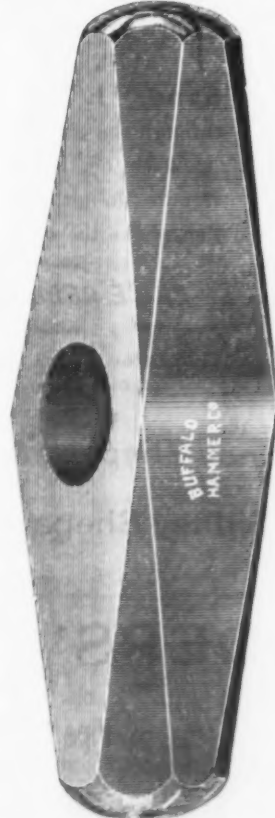
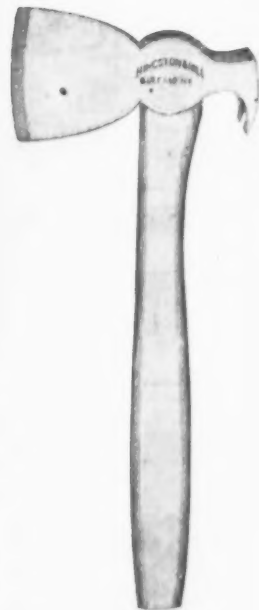
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BUFFALO HAMMER COMP'Y,
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MANUFACTURERS OF SOLID CAST-STEEL

HAMMERS, HATCHETS, SLEDGES,
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Blacksmith's Sledge.
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We are now located in our new works, covering an acre of ground at Black Rock, and with greatly increased facilities in every department can assure the trade of prompt shipment. All goods bearing our name are warranted and guaranteed in every respect. If you have not received a copy of our 64-page 1887 catalogue, we will be pleased to send you one on receipt of postal card request.

For 1887, we are represented in the West by D. F. KEMP and J. G. McKINLAY; in the South by O. C. MEAD; N. Y. and the East, W. H. QUINN & CO., 97 Chambers St.

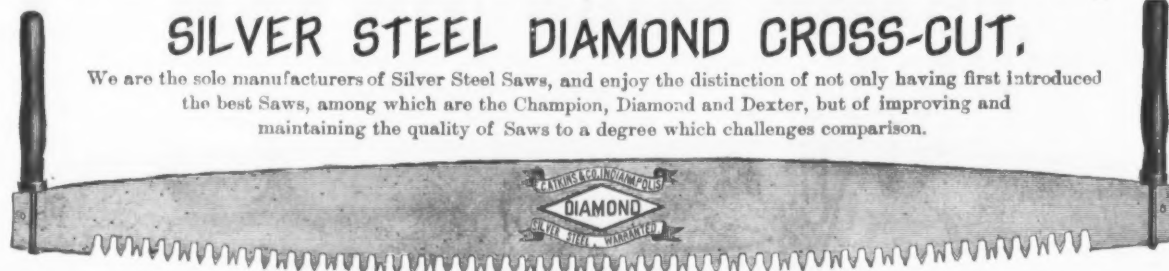
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SILVER STEEL DIAMOND CROSS-CUT.

We are the sole manufacturers of Silver Steel Saws, and enjoy the distinction of not only having first introduced the best Saws, among which are the Champion, Diamond and Dexter, but of improving and maintaining the quality of Saws to a degree which challenges comparison.



Ground substantially uniform gauge on the toothed edge, and any gauge required on the back.

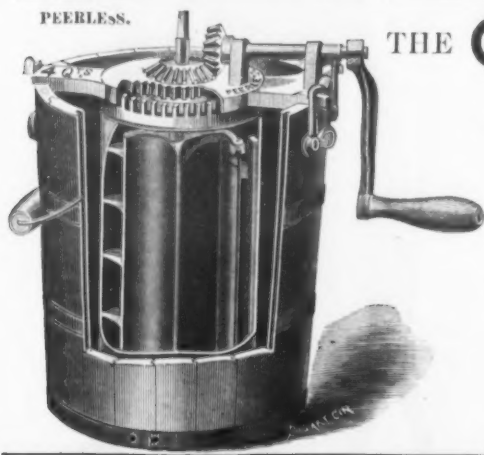
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Are Everywhere Recognized as the Standard of Excellence.

WESTERN AGENCY FOR TANITE EMERY WHEELS.

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Our Freezers Stand Unrivalled. The Best Goods Ever Made. SUPERIOR IN EVERY PARTICULAR.

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PRICES REDUCED FOR 1887!

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WIRE and WIRE NAILS.



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BEST IN THE WORLD.



THE ONLY SIFTER in the market which can be operated with one hand. It does not grind impurities through the wire cloth, like other sifters. With one hand grasp the Wooden Handle (do not touch any other part) and then shake the sifter sideways.

PRICE REDUCED—\$2.00 DOZ.

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Pipe Cutting and Threading Machines

For Pipe, Mill and Steam Fitters' Use.

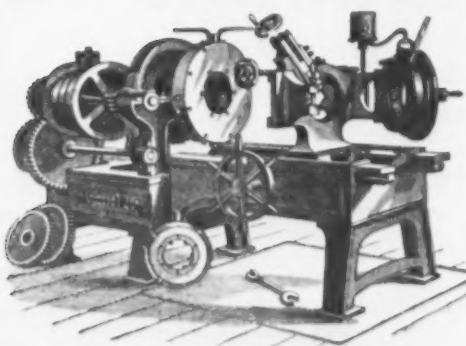
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For Steam Fitting. Also

STEAM AND GAS FITTERS' HAND TOOLS,

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Simple—Durable—Labor-saving. This Truck is adapted to handling all kinds of packages, barrels, boxes, &c., &c. FOR FACTORY USE IT IS UNEQUALLED.

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HUEBNER MANUFACTURING CO.,

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Patent Door Screens, ADJUSTABLE WINDOW SCREENS,

AND

Window Screen Brackets and Frames.

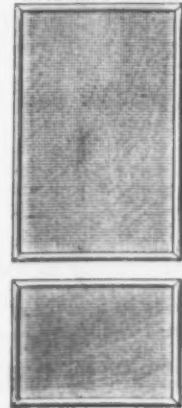
Factory, 236 to 238 E. Fort St.

Store, 205 Jefferson Ave.

DETROIT, MICH.

Send for price-list. Sold by Hardware Dealers everywhere.

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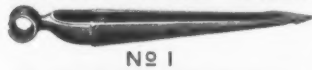
GARDEN CITY SINGLE-ACTING MORTISE SPRING BUTTS.

Manufactured by the CHICAGO SPRING BUTT CO., Chicago, Ill.

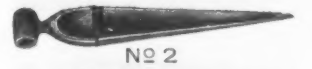
Doors.	LAST JAPANESE, PLAIN SPRING, PER PAIR.	LAST JAPANESE, NICKEL SPRING, PER PAIR.	NICKEL OR BRASS SPRING, PER PAIR.	LAST BRASS SPRING, PER PAIR.
36 to 1 1/2 in.	\$0.75	\$1.00	\$1.00	\$1.00
1 1/2 to 2 in.	1.00	1.50	1.50	1.50
2 to 2 1/2 in.	1.50	2.00	2.00	2.00
2 1/2 to 3 in.	2.00	2.50	2.50	2.50
3 to 3 1/2 in.	2.50	3.00	3.00	3.00
3 1/2 to 4 in.	3.00	3.50	3.50	3.50
4 to 4 1/2 in.	3.50	4.00	4.00	4.00
4 1/2 to 5 in.	4.00	4.50	4.50	4.50
5 to 5 1/2 in.	4.50	5.00	5.00	5.00
5 1/2 to 6 in.	5.00	5.50	5.50	5.50
6 to 6 1/2 in.	5.50	6.00	6.00	6.00
6 1/2 to 7 in.	6.00	6.50	6.50	6.50
7 to 7 1/2 in.	6.50	7.00	7.00	7.00
7 1/2 to 8 in.	7.00	7.50	7.50	7.50
8 to 8 1/2 in.	7.50	8.00	8.00	8.00
8 1/2 to 9 in.	8.00	8.50	8.50	8.50
9 to 9 1/2 in.	8.50	9.00	9.00	9.00
9 1/2 to 10 in.	9.00	9.50	9.50	9.50
10 to 10 1/2 in.	9.50	10.00	10.00	10.00
10 1/2 to 11 in.	10.00	10.50	10.50	10.50
11 to 11 1/2 in.	10.50	11.00	11.00	11.00
11 1/2 to 12 in.	11.00	11.50	11.50	11.50
12 to 12 1/2 in.	11.50	12.00	12.00	12.00
12 1/2 to 13 in.	12.00	12.50	12.50	12.50
13 to 13 1/2 in.	12.50	13.00	13.00	13.00
13 1/2 to 14 in.	13.00	13.50	13.50	13.50
14 to 14 1/2 in.	13.50	14.00	14.00	14.00
14 1/2 to 15 in.	14.00	14.50	14.50	14.50
15 to 15 1/2 in.	14.50	15.00	15.00	15.00
15 1/2 to 16 in.	15.00	15.50	15.50	15.50
16 to 16 1/2 in.	15.50	16.00	16.00	16.00
16 1/2 to 17 in.	16.00	16.50	16.50	16.50
17 to 17 1/2 in.	16.50	17.00	17.00	17.00
17 1/2 to 18 in.	17.00	17.50	17.50	17.50
18 to 18 1/2 in.	17.50	18.00	18.00	18.00
18 1/2 to 19 in.	18.00	18.50	18.50	18.50
19 to 19 1/2 in.	18.50	19.00	19.00	19.00
19 1/2 to 20 in.	19.00	19.50	19.50	19.50
20 to 20 1/2 in.	19.50	20.00	20.00	20.00
20 1/2 to 21 in.	20.00	20.50	20.50	20.50
21 to 21 1/2 in.	20.50	21.00	21.00	21.00
21 1/2 to 22 in.	21.00	21.50	21.50	21.50
22 to 22 1/2 in.	21.50	22.00	22.00	22.00
22 1/2 to 23 in.	22.00	22.50	22.50	22.50
23 to 23 1/2 in.	22.50	23.00	23.00	23.00
23 1/2 to 24 in.	23.00	23.50	23.50	23.50
24 to 24 1/2 in.	23.50	24.00	24.00	24.00
24 1/2 to 25 in.	24.00	24.50	24.50	24.50
25 to 25 1/2 in.	24.50	25.00	25.00	25.00
25 1/2 to 26 in.	25.00	25.50	25.50	25.50
26 to 26 1/2 in.	25.50	26.00	26.00	26.00
26 1/2 to 27 in.	26.00	26.50	26.50	26.50
27 to 27 1/2 in.	26.50	27.00	27.00	27.00
27 1/2 to 28 in.	27.00	27.50	27.50	27.50
28 to 28 1/2 in.	27.50	28.00	28.00	28.00
28 1/2 to 29 in.	28.00	28.50	28.50	28.50
29 to 29 1/2 in.	28.50	29.00	29.00	29.00
29 1/2 to 30 in.	29.00	29.50	29.50	29.50
30 to 30 1/2 in.	29.50	30.00	30.00	30.00
30 1/2 to 31 in.	30.00	30.50	30.50	30.50
31 to 31 1/2 in.	30.50	31.00	31.00	31.00
31 1/2 to 32 in.	31.00	31.50	31.50	31.50
32 to 32 1/2 in.	31.50	32.00	32.00	32.00
32 1/2 to 33 in.	32.00	32.50	32.50	32.50
33 to 33 1/2 in.	32.50	33.00	33.00	33.00
33 1/2 to 34 in.	33.00	33.50	33.50	33.50
34 to 34 1/2 in.	33.50	34.00	34.00	34.00
34 1/2 to 35 in.	34.00	34.50	34.50	34.50
35 to 35 1/2 in.	34.50	35.00	35.00	35.00
35 1/2 to 36 in.	35.00	35.50	35.50	35.50
36 to 36 1/2 in.	35.50	36.00	36.00	36.00
36 1/2 to 37 in.	36.00	36.50	36.50	36.50
37 to 37 1/2 in.	36.50	37.00	37.00	37.00
37 1/2 to 38 in.	37.00	37.50	37.50	37.50
38 to 38 1/2 in.	37.50	38.00	38.00	38.00
38 1/2 to 39 in.	38.00	38.50	38.50	38.50
39 to 39 1/2 in.	38.50	39.00	39.00	39.00
39 1/2 to 40 in.	39.00	39.50	39.50	39.50
40 to 40 1/2 in.	39.50	40.00	40.00	40.00
40 1/2 to 41 in.	40.00	40.50	40.50	40.50
41 to 41 1/2 in.	40.50	41.00	41.00	41.00
41 1/2 to 42 in.	41.00	41.50	41.50	41.50
42 to 42 1/2 in.	41.50	42.00	42.00	42.00
42 1/2 to 43 in.	42.00	42.50	42.50	42.50
43 to 43 1/2 in.	42.50	43.00	43.00	43.00
43 1/2 to 44 in.	43.00	43.50	43.50	43.50
44 to 44 1/2 in.	43.50	44.00	44.00	44.00
44 1/2 to 45 in.	44.00	44.50	44.50	44.50
45 to 45 1/2 in.	44.50	45.00	45.00	45.00
45 1/2 to 46 in.	45.00	45.50	45.50	45.50
46 to 46 1/2 in.	45.50	46.00	46.00	46.00
46 1/2 to 47 in.	46.00	46.50	46.50	46.50
47 to 47 1/2 in.	46.50	47.00	47.00	47.00
47 1/2 to 48 in.	47.00	47.50	47.50	47.50
48 to 48 1/2 in.	47.50	48.00	48.00	48.00
48 1/2 to 49 in.	48.00	48.50	48.50	48.50
49 to 49 1/2 in.	48.50	49.00	49.00	49.00
49 1/2 to 50 in.	49.00	49.50	49.50	49.50
50 to 50 1/2 in.	49.50	50.00	50.00	50.00
50 1/2 to 51 in.	50.00	50.50	50.50	50.50
51 to 51 1/2 in.	50.50	51.00	51.00	51.00
51 1/2 to 52 in.	51.00	51.50	51.50	51.50
52 to 52 1/2 in.	51.50	52.00	52.00	52.00
52 1/2 to 53 in.	52.00	52.50	52.50	52.50
53 to 53 1/2 in.	52.50	53.00	53.00	53.00
53 1/2 to 54 in.	53.00	53.50	53.50	53.50
54 to 54 1/2 in.	53.50	54.00	54.00	54.00
54 1/2 to 55 in.	54.00	54.50	54.50	54.50
55 to 55 1/2 in.	54.50	55.00	55.00	55.00
55 1/2 to 56 in.	55.00	55.50	55.50	55.50
56 to 56 1/2 in.	55.50	56.00	56.00	56.00
56 1/2 to 57 in.	56.00	56.50	56.50	56.50
57 to 57 1/2 in.	56.50	57.00	57.00	57.00
57 1/2 to 58 in.	57.00	57.50	57.50	57.50
58 to 58 1/2 in.	57.50	58.00	58.00	58.00
58 1/2 to 59 in.	58.00	58.50	58.50	58.50
59 to 59 1/2 in.	58.50	59.00	59.00	59.00
59 1/2 to 60 in.	59.00	59.50	59.50	59.50
60 to 60 1/2 in.	59.50	60.00	60.00	60.00

Bit Braces of all Kinds and of Superior Quality.


IVES PATENT TAP BORERS




No 1



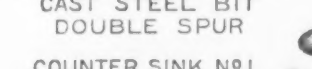
No 2




No 4 VOLUTE




CAST STEEL BIT DOUBLE SPUR



COUNTER SINK No 1

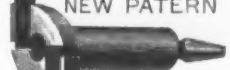


SPOFFORD BRACE

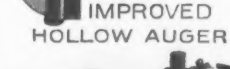


IMPROVED SPOFFORD


NEW PATERN




IMPROVED HOLLOW AUGER




No 1 EXPANSIVE HOLLOW AUGER (IVES' PATENT)



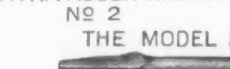
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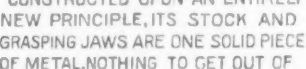
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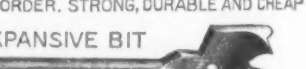
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SPOON



SPOON



SPOON

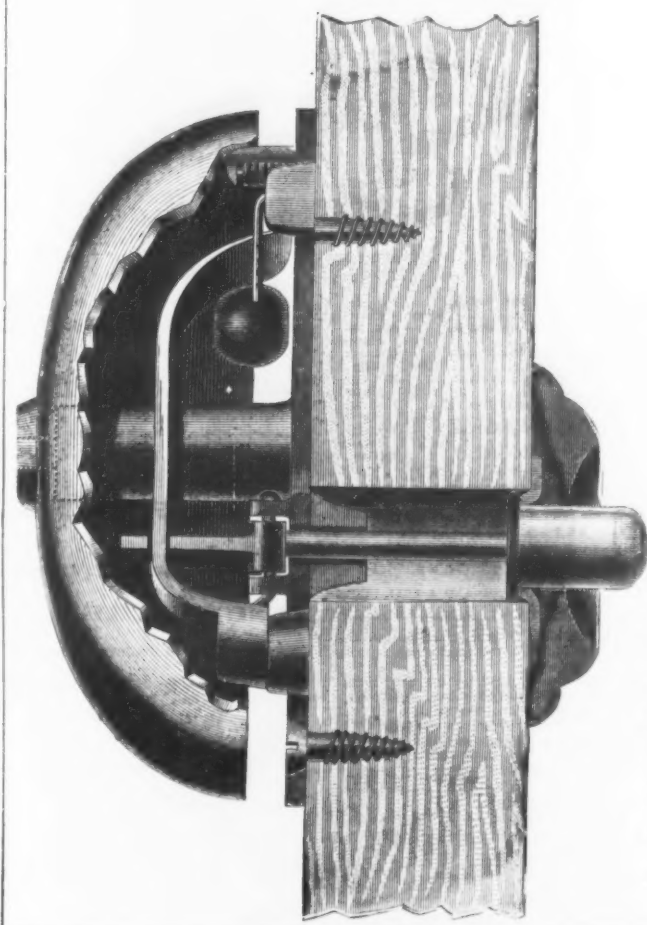


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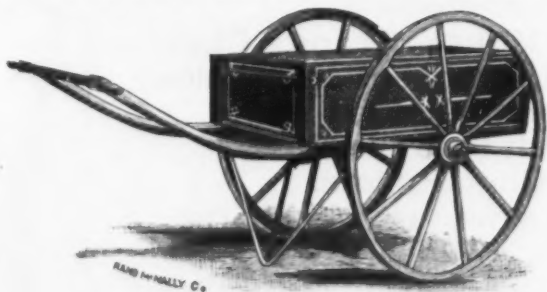
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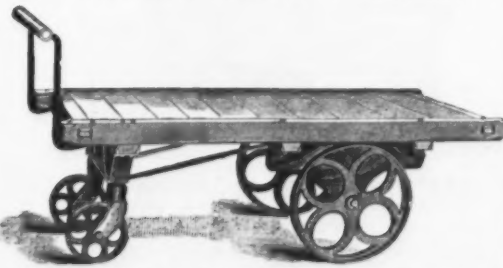
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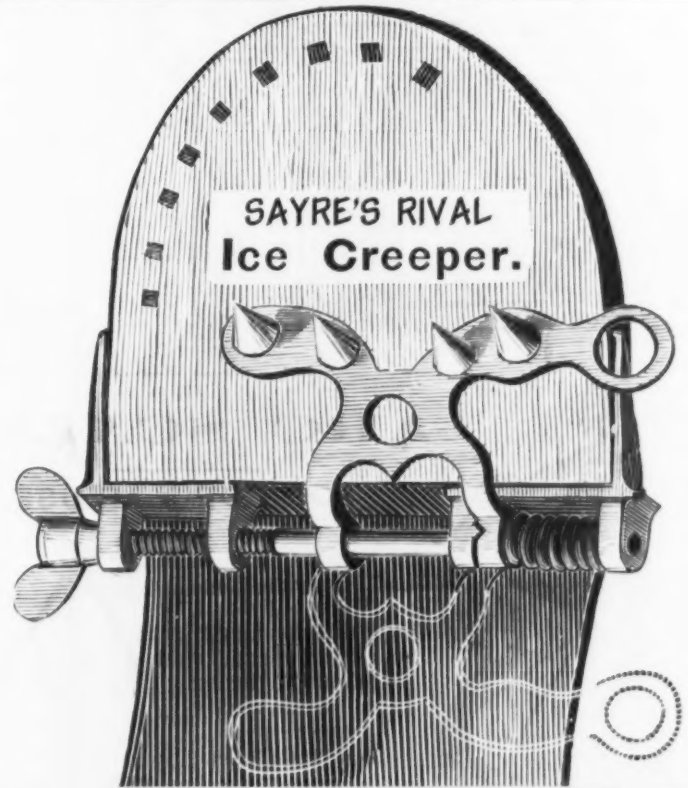


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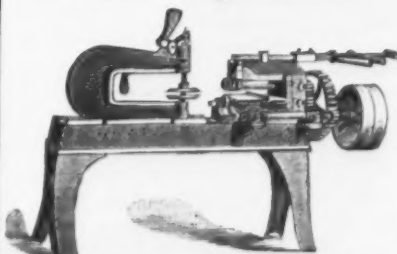
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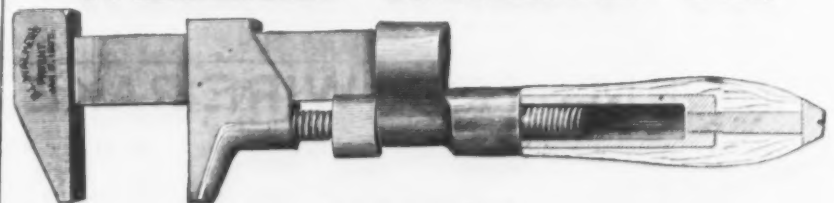
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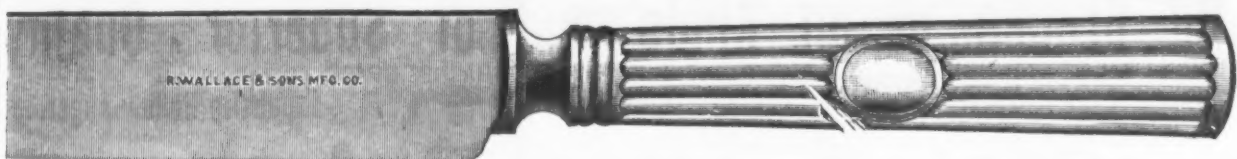
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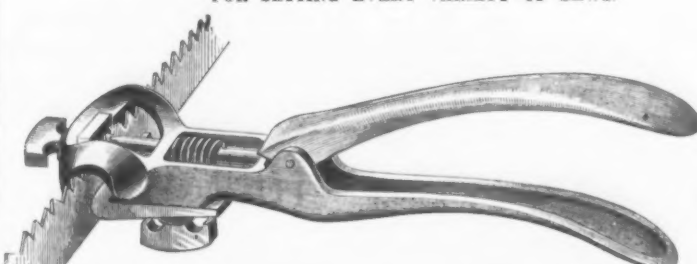


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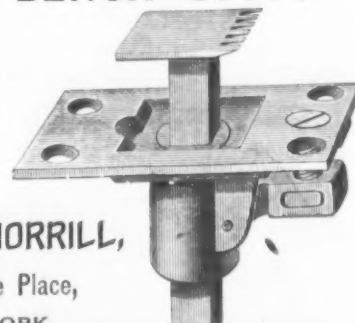
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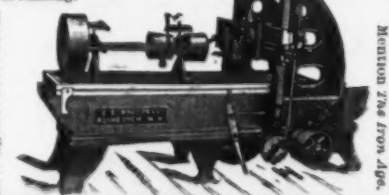


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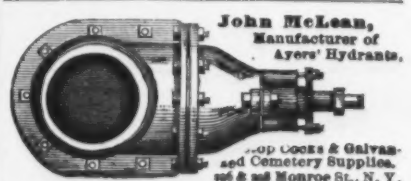
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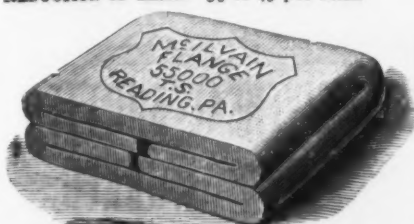
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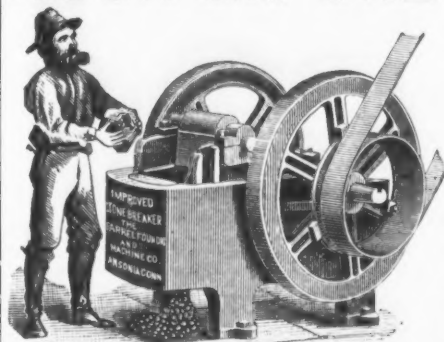
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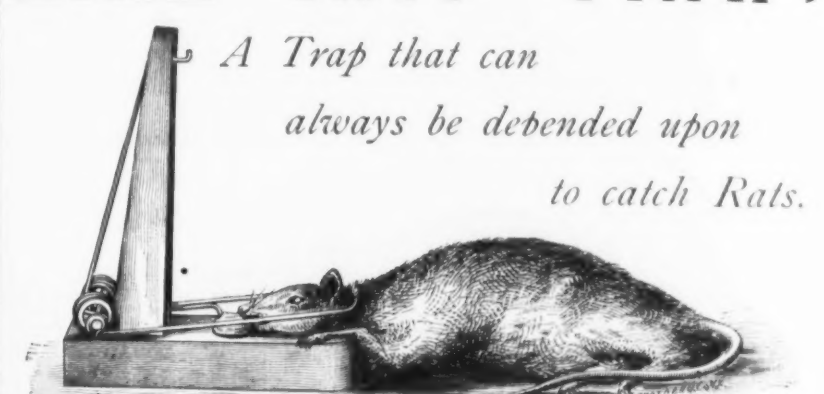
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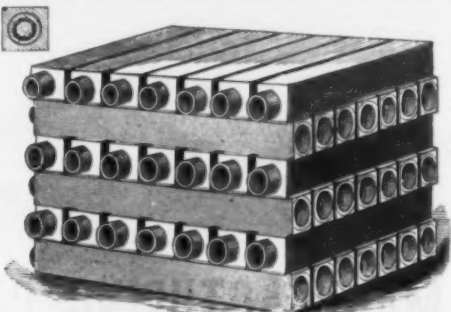
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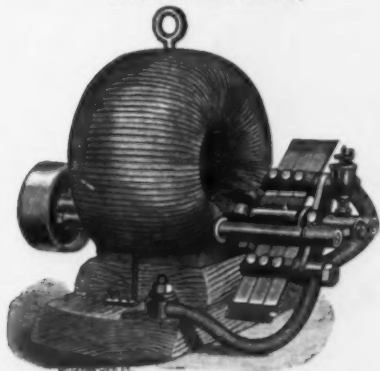
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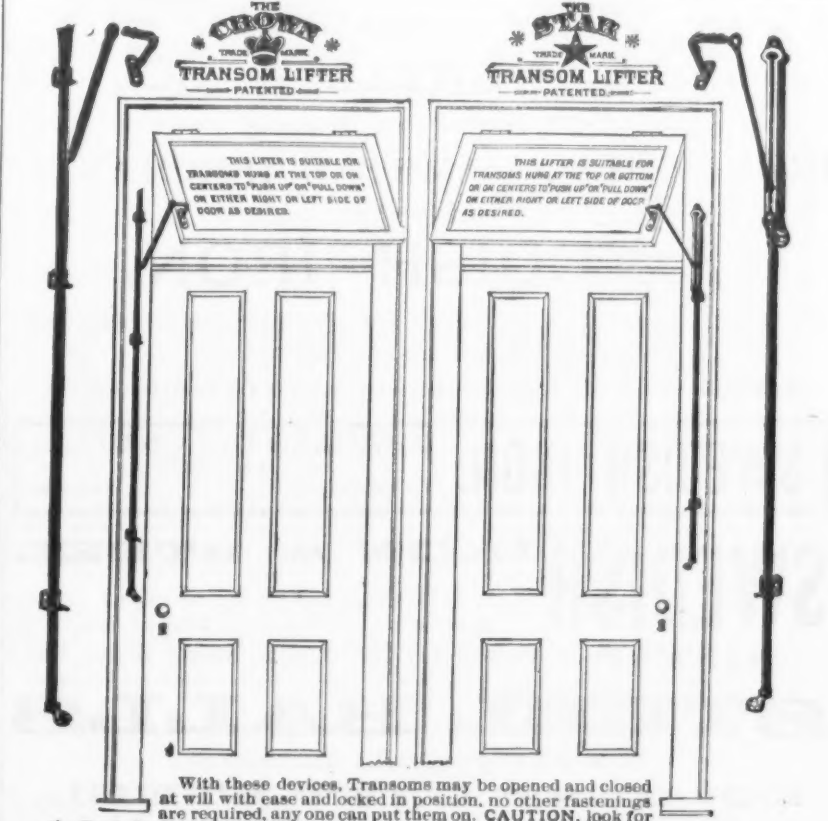
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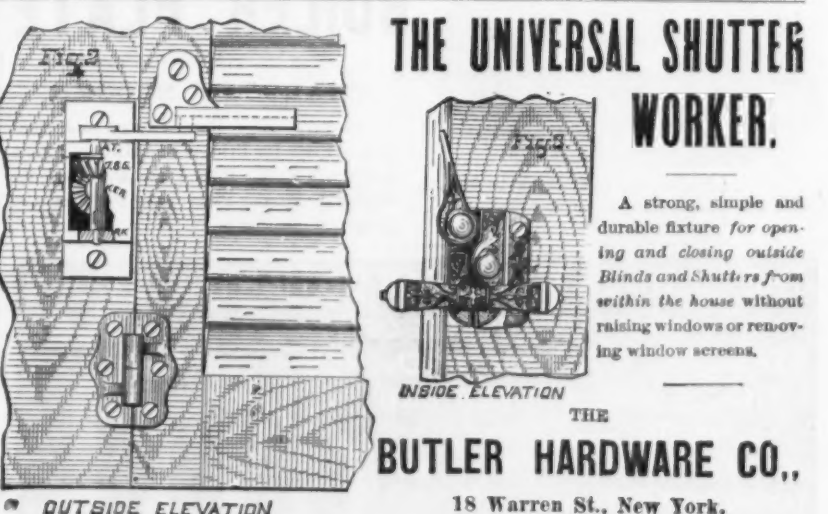
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44	4 "	" "	" " " " 0.65	1886.	84	4 "	" "	" " " " 0.80	84 1/2	4 "	" "
45	5 "	" "	" " " " 0.75		85	5 "	" "	" " " " 0.90	85 1/2	5 "	" "
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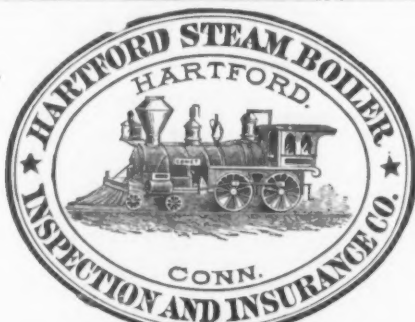
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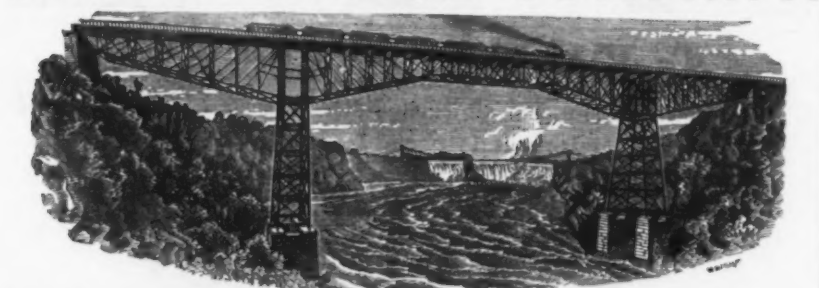
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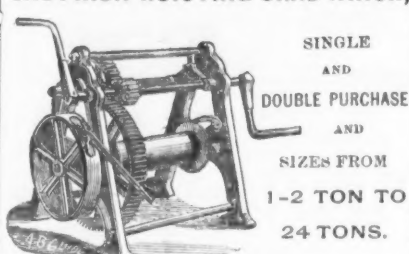
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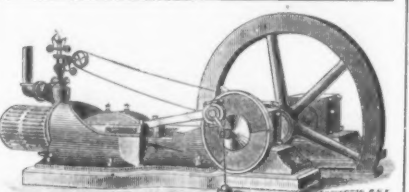
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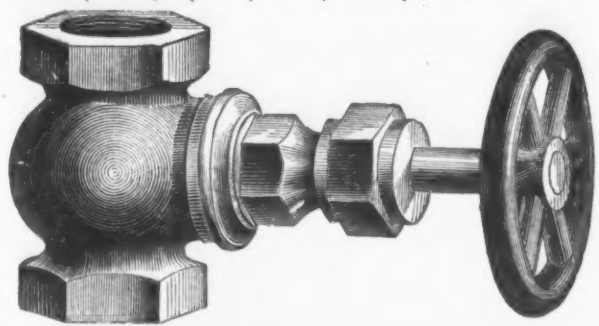
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Rim Fire Cartridges, 8.08 cal. \$665 00
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Rim Fire Cartridges, 8.32 cal. \$685 00
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Rim Fire Cartridges, 8.92 cal. \$735 00
Rim Fire Cartridges, 8.98 cal. \$740 00
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Rim Fire Cartridges, 9.22 cal. \$760 00
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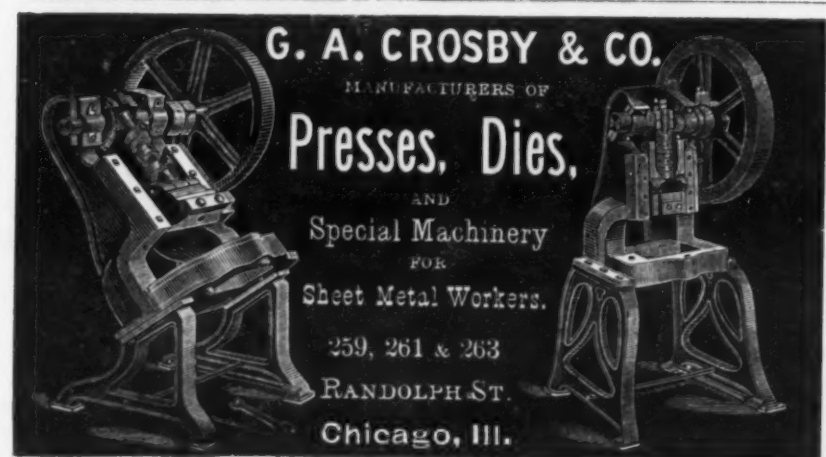
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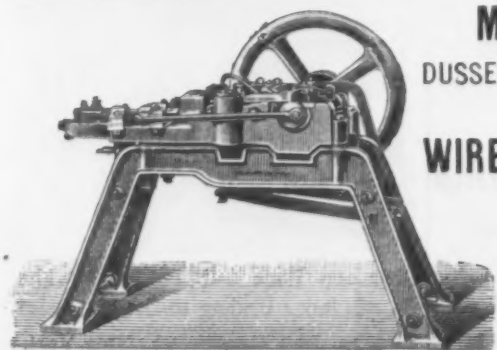
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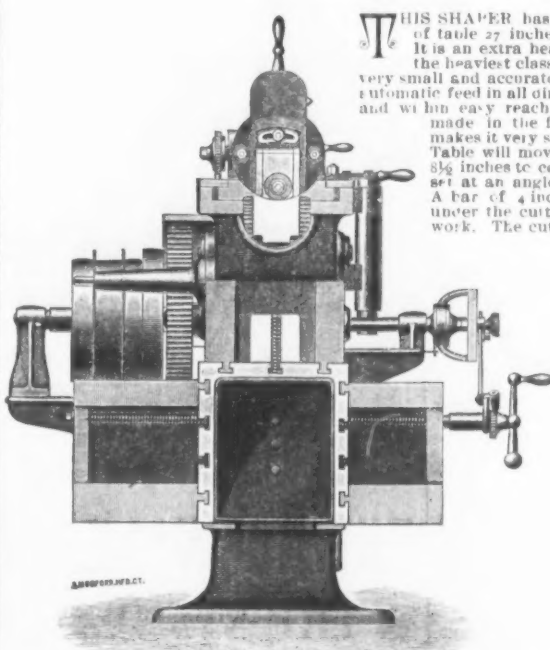
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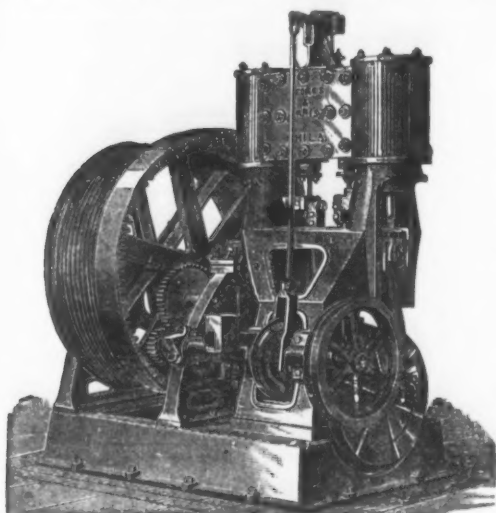
Weight of Machine, 2700 pounds. Size of Tight and Loose Pulleys on C. Shaft, 12 x 3. Speed of Counter Shaft 250 revolutions.

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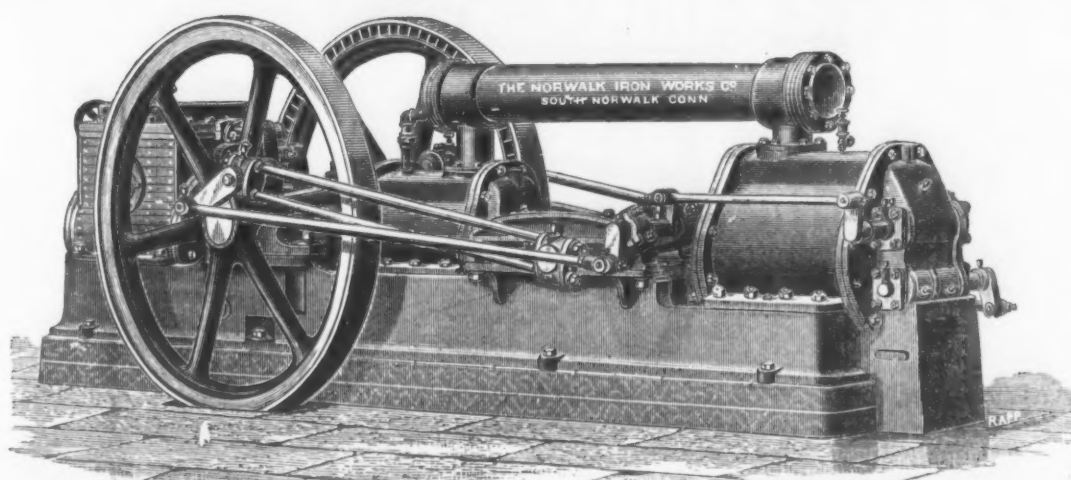
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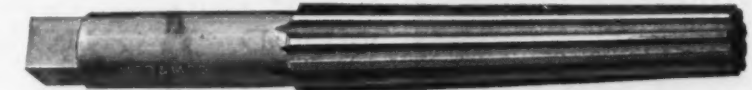
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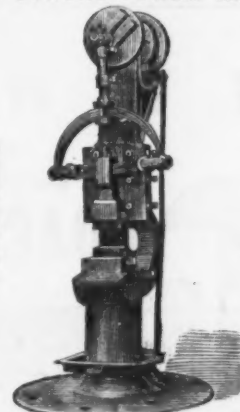
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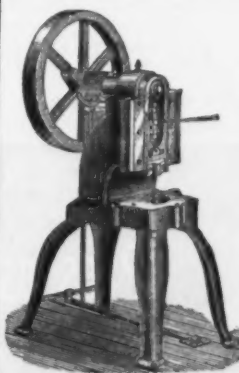


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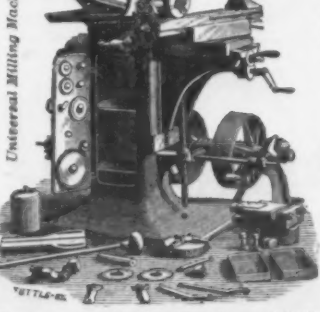
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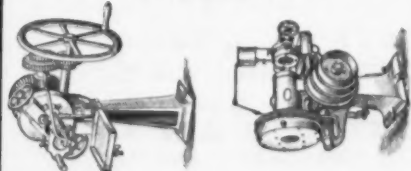


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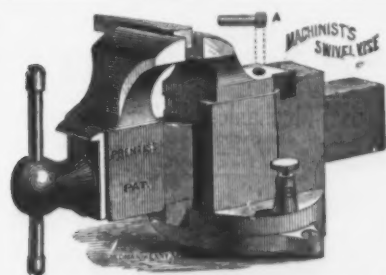
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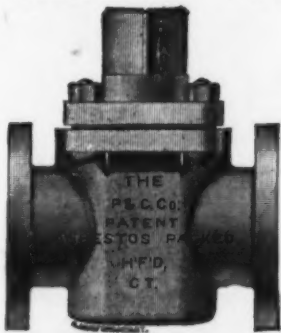
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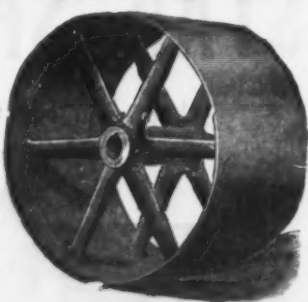


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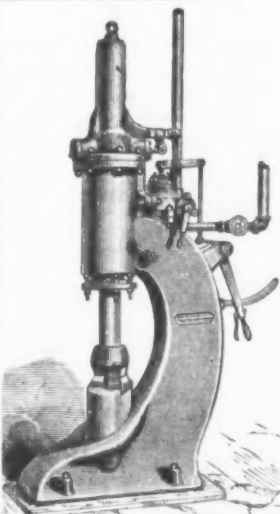
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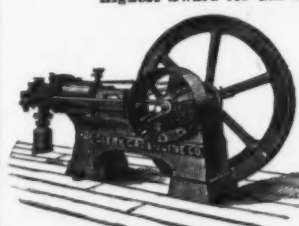
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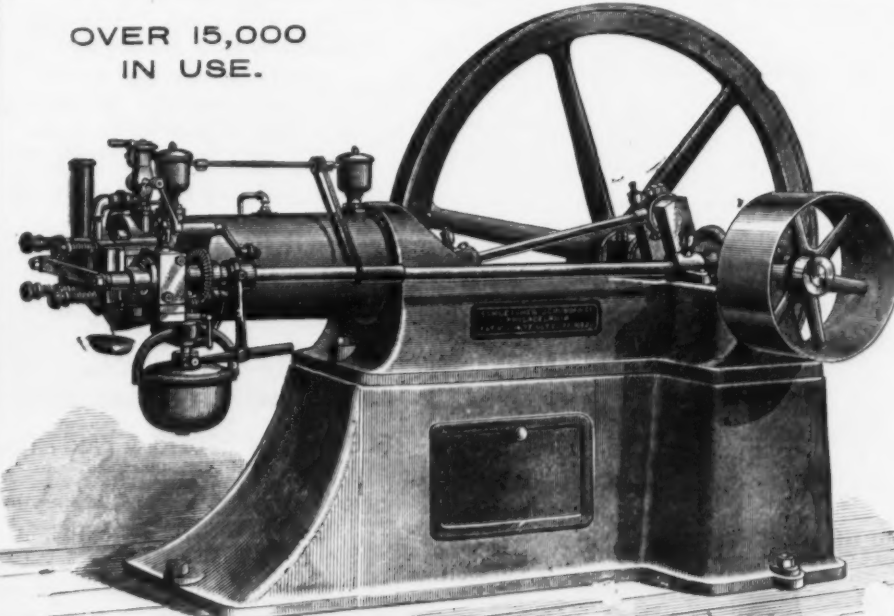
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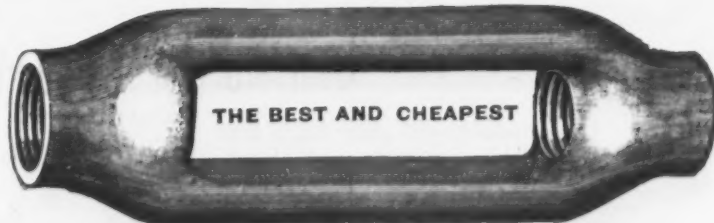
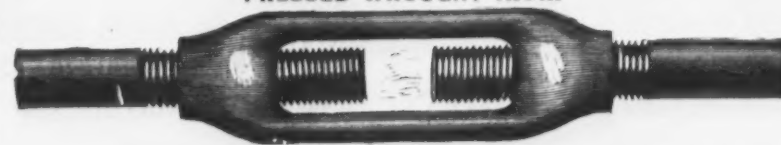
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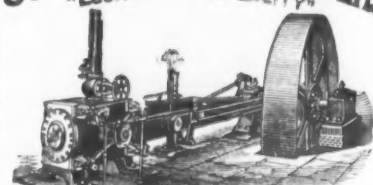
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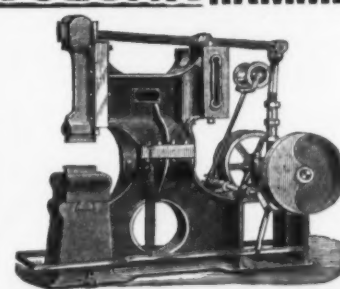
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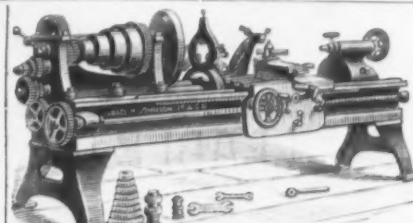
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